For producers of Sand and Gravel, Crushed Stone, Cement, Lime, Gypsum, and other nonmetallic minerals

AUGUST 1957

PIT and QUARRY

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Modern Office at New Denver Plant of Inland Sand & Gravel Co.

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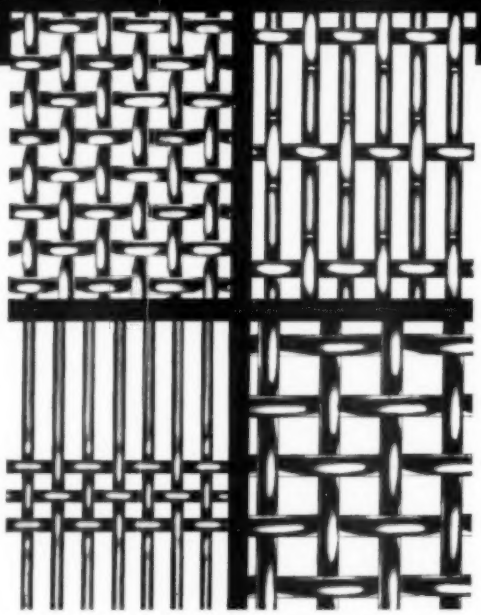

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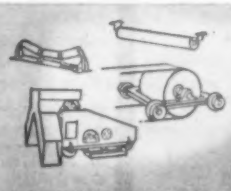
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pit and quarry

THE BASIC MAGAZINE OF A BASIC INDUSTRY

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Cover Picture

• This modern office and scale building of Inland Sand and Gravel Company near Denver, Colo., is typical of a trend in the pit-and-quarry industries to make their operations more attractive in appearance and more comfortable for their employees. This building is well insulated and has electric baseboard heating panels installed around the perimeter of each room for comfort during the severe winters and moderate summers in this area. The plant is a modern, nearly automatic operation designed to produce a wide range of sizes from a difficult deposit.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals.

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To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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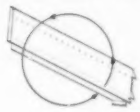
SAVES COST—SAVES SPACE. Elimination of unnecessary parts—heavy outer bearings and frames—reduces overall weight of Denver-Dillon Vibrating Screens by 30% to 50%. Width is considerably reduced. Cost is lower—space requirements are lower—than for 4-bearing types.

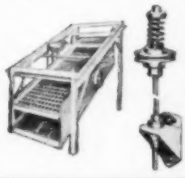
Distinctive Features:

Only 2 Bearings

Floating Circle Action



Suspended Construction



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Find out how a Denver-Dillon can cut your screening costs, increase your profits. Write, wire or phone. Flowsheets for every screening job on request. Ask for Bulletin S3 B15.

DENVER *Forced-Feed* JAW CRUSHERS

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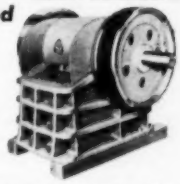

Denver forced-feed crushers have anti-friction pitman and side bearings. Cast steel frame on 10" by 20" and smaller sizes, welded steel frame on larger sizes to 36" x 48". Jaw plates can be inverted for longer wear. Forced feed plus extra long jaws assure highest capacity.

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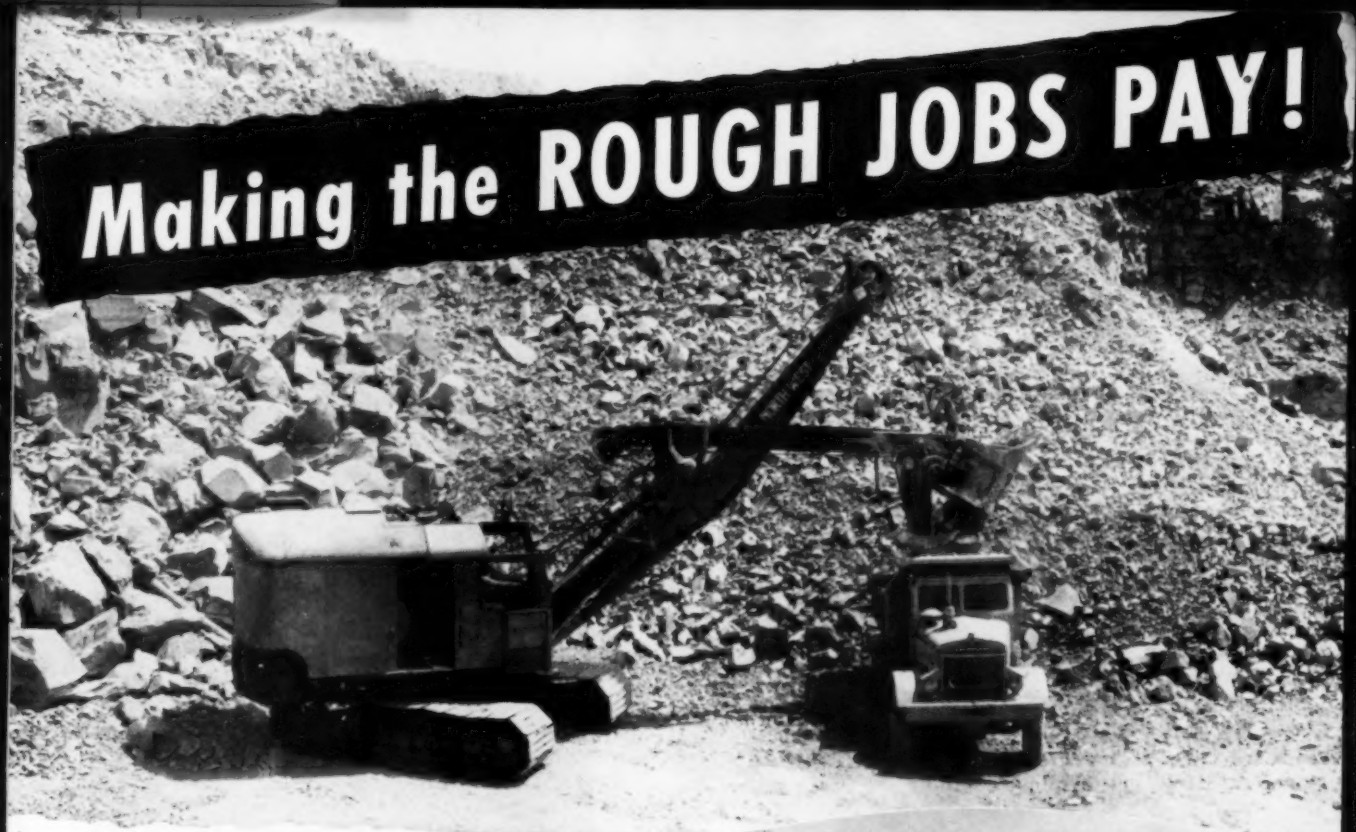

CAROLINA SOLITE CORP. of Aquadale, N. C., makes lightweight aggregate out of a tough quartzy material known as Monroe slate (SiO_2). It has a hardness of 7 and it provides as tough a test on shovel operation as will be found anywhere.

The shot rock which comes out in large chunks is loaded by a Model 6 Northwest Shovel which has been in the pit since 1953.

The significant thing lies in the fact that in spite of the character of the digging and four years of almost constant service the Northwest has required no repairs. Northwests make the rough jobs pay.

The Carolina Solite Corporation is owned by the Southern Lightweights Aggregates Co. and the Southern Materials Co. of Richmond, Virginia. The fact that these combined companies have bought well over 20 Northwest machines indicates how Northwest equipment has performed on their operations. Northwest Shovels are real Rock Shovels and when you have a *real* Rock Shovel you can be sure of high output in any digging. Northwests bring you the plus service that you want. They are built for the toughest job a shovel has to do. Let a Northwest Man give you complete details on the many Northwest advantages.

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SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

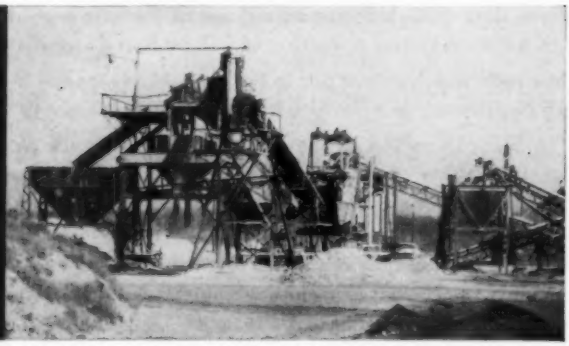
Convertible for any Mining Material Handling or Excavation Problem

"to keep grizzly materials moving, we had to have three men pushing and shoving,"

reports Mr. Ray Holman, Quarry Superintendent, Quartzite Stone Company, Inc. of Lincoln, Kansas.

"JEFFREY grizzly feeders increased production at each plant 30 tons per hour... a 30% increase"

The Lincoln Plant installed a 5' x 10' long Jeffrey grizzly feeder in September, 1949.



Quartzite Company's Wolf Creek Plant added a similar Jeffrey grizzly feeder in May, 1952.

Grizzly materials are often difficult to keep moving here, especially when they're wet. Even with three men on these bar screens, rock didn't get to the crushers as fast as these plants could handle it.

Addition of Jeffrey electric vibrating feeders eliminated the need for the three men at the grizzlies and permitted later operations to work at capacity. Mr. Holman estimates that each plant was able to boost production by 30 tons—to 125 tons per hour.

Regarding maintenance on this Jeffrey equipment, he says, "Nothing beyond renewing the grizzly bars occasionally."

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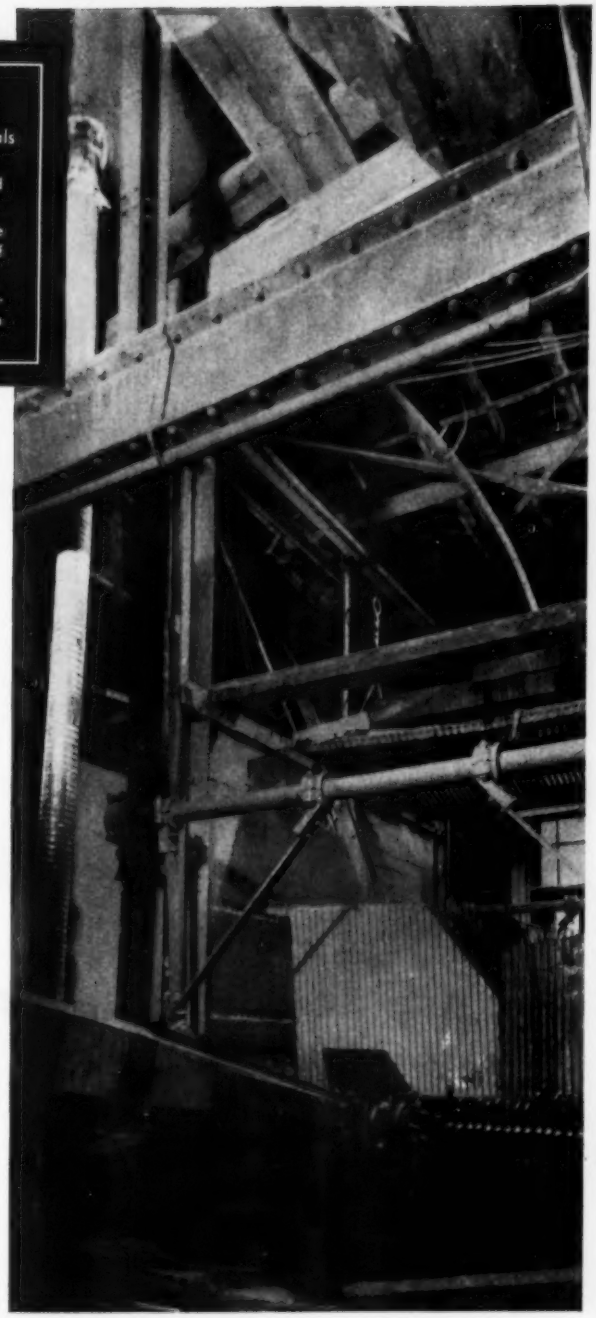

Twice a steel pipe's life—still has years to go

The silica-sand-and-water that's so effective at cutting solid marble also gouges through steel pipe in short order. In fact, the heaviest pipe this Great Lakes' firm used on its cutter barely made it to the 2½-year mark. And throughout its life, repairing leaks had been an all-too-frequent chore.

But a suggestion by the G.T.M.—Goodyear Technical Man—changed all that. For the bigger pump-to-storage-tank line, he specified Diversipipe—rugged rubber pipe with phenomenal abrasion-resistance. And it was Style M Sandblast Hose for the tank-to-saw-blade link—where more flexibility is needed. The pay-off: The G.T.M.'s recommendation *has already put in close to 5 years of trouble-free service—looks good for many more.*

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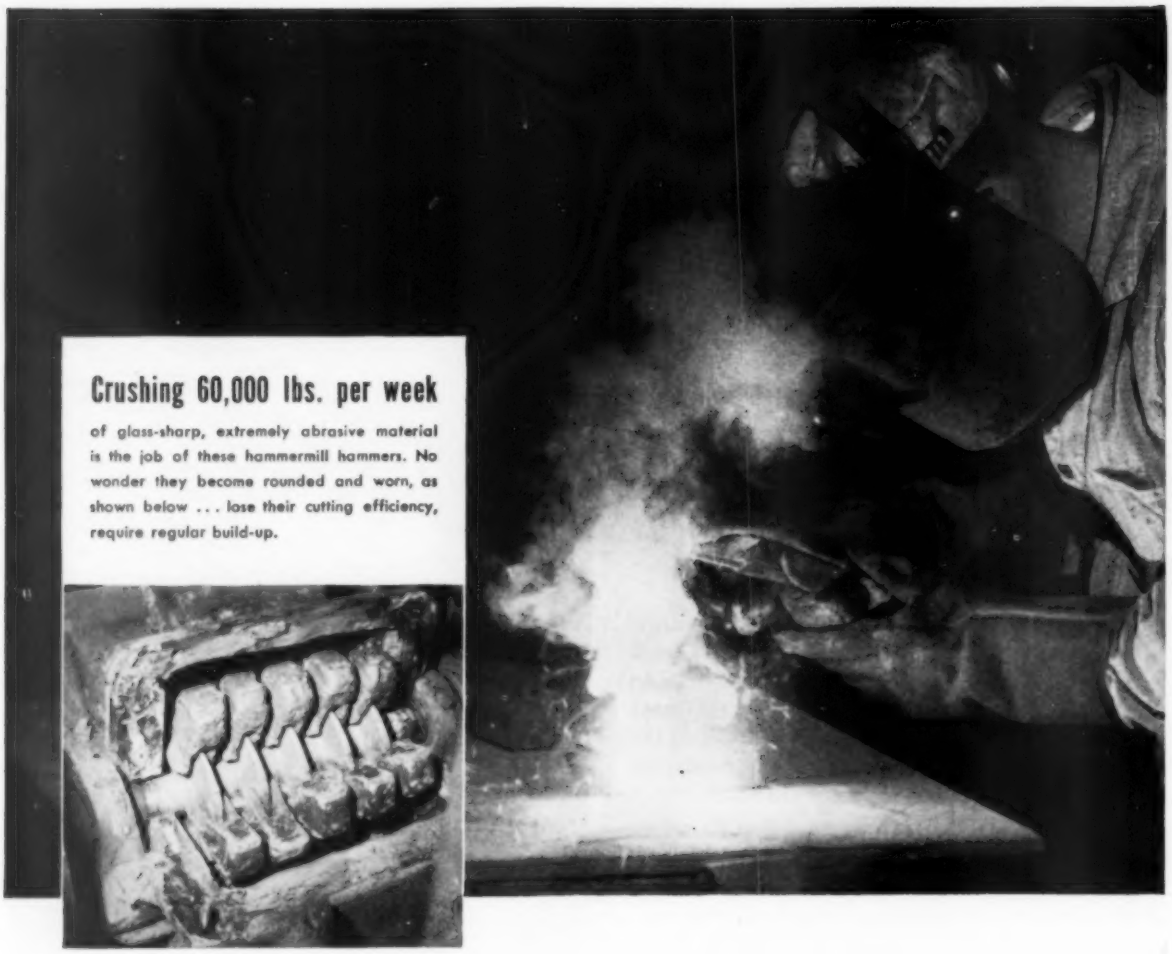

Crushing 60,000 lbs. per week

of glass-sharp, extremely abrasive material is the job of these hammermill hammers. No wonder they become rounded and worn, as shown below . . . lose their cutting efficiency, require regular build-up.

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2. Super HF-20 electrodes cost about 40% less than the type previously used.
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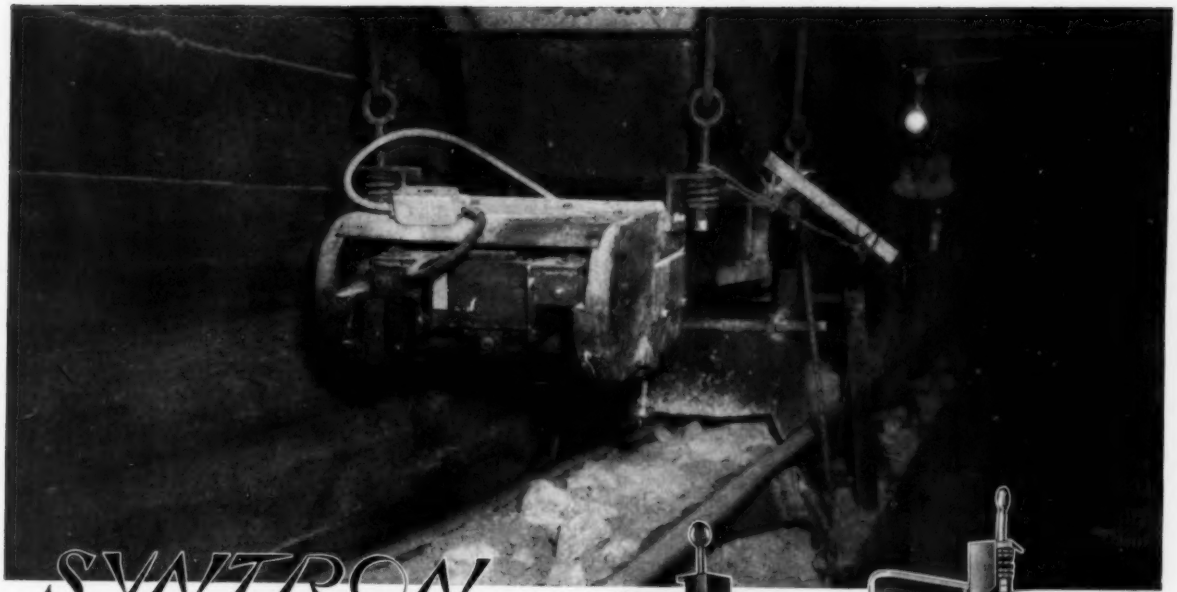

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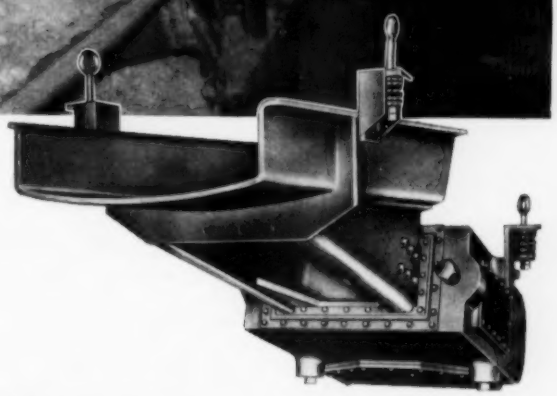
"Vibra Flow"

VIBRATORY FEEDERS



—provide a low cost way of handling sand, gravel and cement

Syntron "Vibra-Flow" Vibratory Feeders with variable control rate of materials flow will match the capacity of your processing equipment—increase production. SYNTRON Vibratory Feeders are applicable to most any bulk materials handling problem. They provide a smooth, even flow of bulk materials, whether it be sand, gravel, limestone, sandstone or metallic ores, to screens, conveyor belts, pulverizers, crushers and other types of equipment.

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Other SYNTRON Equipment of proven Dependable Quality

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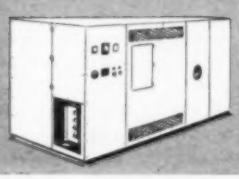
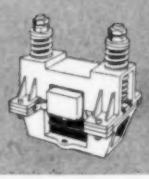
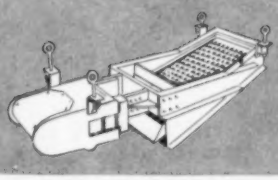


BIN VIBRATORS



VIBRATING SCREENS



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The Editor's Page

Safety for All!

THE latest edition of the National Safety Council's statistical yearbook, *Accident Rates,* shows that 1956 industrial injury rates among member companies showed substantial reductions in both frequency and severity from those of 1955. Twenty-nine of the 40 basic industry classifications reduced their frequency rates; 20 of the 40 reduced their severity rates.

The average accident frequency rate for all industries, based on the number of disabling injuries per 100,000 man-hours, was 6.38 in 1956—a reduction of 8 percent from the year before. In the cement industry the rate was 3.08—an increase of 16 percent over 1955. This puts cement in fifth place among these industries, instead of fourth, as in 1955.

Because of the difficulty of getting enough information in time for publication in this booklet, the 1956 figures for the two categories which cover other nonmetallic minerals industries could not be included. Instead, the latest available figures—for 1955—were listed. These showed frequency rates of 10.01 for the quarry industries (stone and sand and gravel) and 19.93 for mining (other than underground coal). These were good for 30th and 37th place, respectively, in the 1955 standings.

Breakdown figures for the quarry industries show that in 1955 stone had a better record than sand and gravel in both frequency and severity. In the mining group the nonmetals group had a higher frequency rate than the metals, but a substantially better severity rate.

THE average accident severity rate for all industries reporting to the National Safety Council, based on the number of days lost per 1,000,000 man-hours, was 733 in 1956—a decrease of 10 percent from 1955. In the cement industry the severity rate was 1,588—an increase of 16 percent over 1955. This puts cement in 34th place among these 40 industries, instead of 33rd, as in 1955. The increase of 16 percent was at least lower than the 45 percent increase of 1955 over 1954.

For the reasons given above there are no 1956 figures for the quarry industries or for mining (other than underground coal). In 1955 these two had severity rates of 3,136 and 2,290, respectively, which were good for 39th and 36th place out of 40.

There is some reason to believe that these groups may have improved their records and standings for both frequency and severity in 1956. This feeling is based on the fact that advance reports of the National Lime Association's contest indicates a sharply improved record in 1956. In this contest 18 plants had accident-free years for a new record. The accident-frequency rate was the lowest on record; and the severity rate was also low, but it was not a record.

THERE have been a number of new developments in safety methods in recent years, and one of the most promising of these is the controversial but growing practice of giving workers pre-placement physical examinations. This practice was described at the National Safety Congress by John A. Volpe, a prominent contractor and Commissioner of Public Works for Massachusetts. He called the general avoidance of such examinations an area of "no control," which is one of the most serious gaps in safety. He asked, "Is it any more irresponsible for management to ask an employee to climb a scaffold which may collapse than to ask that a scaffold be mounted by an employee who may collapse?"

Impressive figures were quoted to bear out Mr. Volpe's statements. At one large company, of nearly 28,000 persons taking pre-placement physicals, more than 13,000 were found to have hernia or some defect of eyes, ears, heart, or spine. Another study of 3,500 industrial plants showed that pre-placement examinations decreased accident frequency by 44 percent, occupational diseases by 46 percent, labor turnover 29 percent, absenteeism 39 percent and compensation insurance costs 30 percent. The benefits to be derived from such examinations are considerable for any industry, but particularly for those which are by their very nature hazardous. Most of the nonmetallic minerals industries admittedly fall in this category.

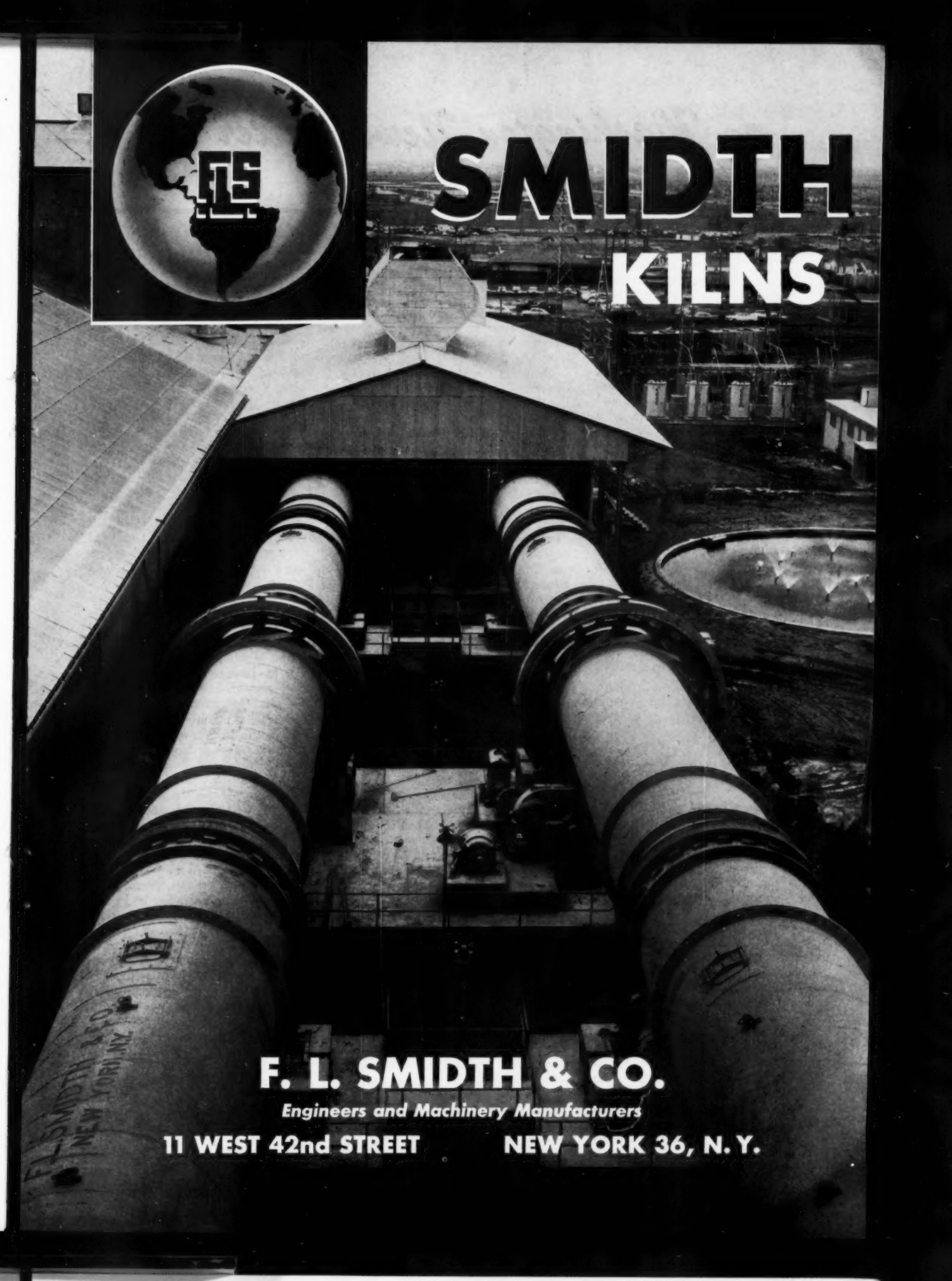
There has been considerable resistance to such examinations on the part of workmen and labor leaders, and too few employers insist on them. The results of such examinations should not bar a worker from employment in an industry; they should result in his being given a type of work in which his deficiencies will not jeopardize his safety or that of his fellow workers. Assurance that these examinations would not be used unfairly would eliminate the fears of those who oppose them.

ANOTHER basic concept of industrial accident prevention now receiving renewed attention is that of the "human element." Management has built safety into new plants and rebuilt it into old ones. Safety committees and programs have been organized, and personal protective equipment has been provided for employees. But in many plants and industries these important features of an accident prevention program seem to have reached the point of diminishing return, apparently due to lack of appreciation on the part of employees for management's desire to protect them from occupational hazards.

More attention must be given to the individual or "human element" approach to safety if further progress is to be made. Every individual worker must be made to understand the need for safety and urged to co-operate and practice accident prevention all the time.

There still remain, of course, the thousands of plants where, apparently, little or nothing is done about safety. The number of such plants is diminishing, but much too slowly for their own or their employees' best interests. Such plants report to no one, enter no safety contests, nor do they in any other way go on record. But newspaper reports from time to time tell of serious and usually preventable accidents in such plants indicating that their accident rates must be shockingly high. Such operators can blame only themselves if unions or the government takes over safety enforcement in the interests of their employees.

Walter E. Trauffer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NEW YORK 36, N. Y.

Washington News Letter

By S. HERBERT UNTERBERGER

THIS is the season when members of Congress normally pack up and leave Washington. Some members go home to look after their political fences. Others take off on vacation trips, which may involve the investigation of matters related to congressional activities. In such cases, the trips are tax free, and frequently may be paid for out of the budget of some congressional committee. This year however, the confusion in Washington is so great that Congress may stay in session well beyond the expected time. Vacation schedules have already been reworked, and many a Congressional junket has been consigned to the category of "forlorn hopes."

As if the system of "checks and balances" had not provided trouble enough in the running battle between the President and Congress, which has been going on since the beginning of this session, the recent decisions of the Supreme Court have added a third dimension to the picture. It is interesting to observe that twice in a single generation the presumably serene Supreme Court has become the focal point in the ever-continuing Battle of Washington.

To be sure, in the previous fight over the power of the Supreme Court, when President Roosevelt tried to change its outlook by increasing its size, the most disgruntled party was the executive branch of the government while the Congress, whose laws were being declared unconstitutional, was relatively indifferent and completely unprepared to take the radical step desired by the Administration. This situation is understandable, since the Supreme Court's actions at that time, as seen in its action declaring the N.R.A. unconstitutional, appeared to undermine the Administration's program. In the current "set-to" the most disgruntled party is the Congress, while the executive branch of the government, as represented by the President, although obviously not delighted with the Court's actions, is clearly unprepared to take any strong measures. This is equally understandable because now it is the program of Congress which appears to have been affected.

Only time will tell whether the Supreme Court's decisions upholding individual liberties will ultimately turn out to be a victory for democracy or for its enemies. Interesting to political observers here in Washington is the fact that the alignment on the supposedly stodgy Supreme Court may even have anticipated slightly the political alignment found elsewhere. Rather than "following the election returns," a practice of which it has been accused, the Court may actually be taking a strong hand in *creating* those election returns.

This trend is seen most strongly in the current battle over civil rights, which is the issue most likely to prevent Congress from adjourning. There has always been a pro-civil rights group in the Congress. This group was probably strongest during the Roosevelt Administration, but understanding the dynamite involved in the issue, President Roosevelt and his administration managed adroitly to avoid any head-on collision on this issue. The Truman administration, in its usual undirected manner, managed to be on both sides of the issue, alternatively or even at the same time. The Supreme Court's decision in the school segregation case made the issue clear-cut, with the friends and enemies clearly identified and at each other's throats. Significantly, it was the combination of Roosevelt and Eisenhower appointees which made this possible.

The reaction to that decision was, of course, no surprise. Since every stratagem in the books as well as a few not yet recorded, has been used to prevent its implementation, the next step—the passage of implementing legislation—was sure to follow. This action took the form of civil rights legislation which, from present indications, can command the necessary votes to pass both houses of Congress, provided the matter ever gets to a vote.

In Congress the same forces are at work as within the Supreme Court. However, these are elected officials, rather than appointees. Nevertheless, the overwhelming pro-civil rights vote results from a combination of Roosevelt-type big city Democrats and Eisenhower modern Republicans, primarily from northern communities or western areas where minority groups are not very prominent.

The old conservative Republican-Southern Democratic coalition which was powerful enough to run the Congress particularly during the Truman administration, is now probably at its lowest point. But it is not so lacking in power that it cannot hold up the wheels of Congressional progress. And it is now being predicted that this is exactly what will happen. There is danger of a complete stalling. The Southerners, particularly, threaten the longest filibuster ever staged against the proposed civil rights legislation. The oldsters around Washington explain ruefully that to have avoided this, "they never should have air conditioned the Senate chamber."

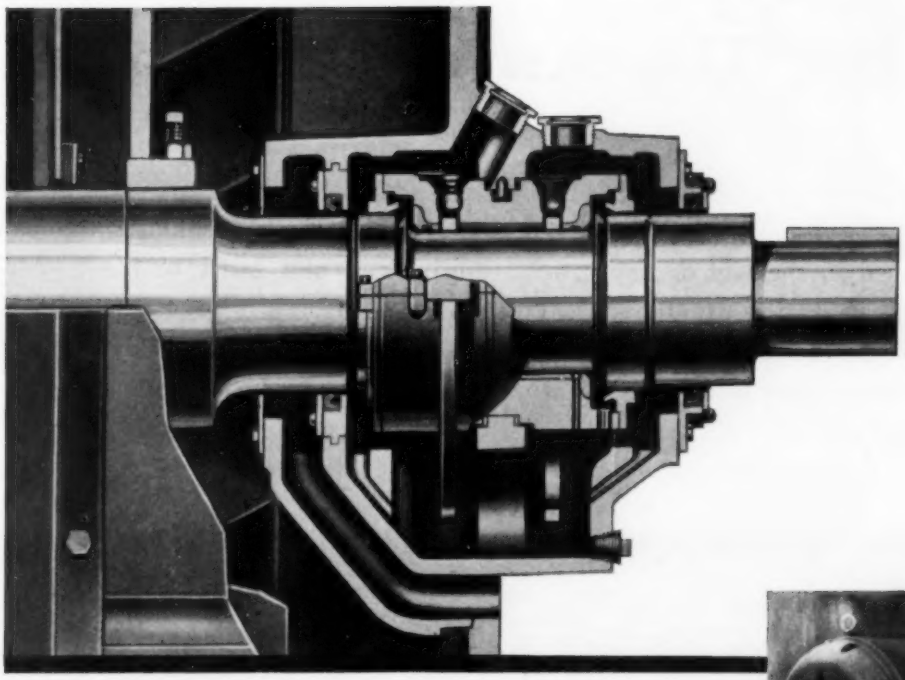
Although much remains to be done in this session of Congress, the confusion resulting from the friction between the executive, legislative, and judicial branches of government has grown so great that, at least for the time being, calm and creative thinking appears to be out of the question. The principal victim of the struggle seems to be much of the Eisenhower program. While the Supreme Court has put certain limitations on the investigative and other powers of Congress, and while Congress is trying to figure out how to strike back either by legislating restrictions on the Supreme Court or somehow attacking it through its budget the Eisenhower program for better schools, better foreign aid, and better defense, is languishing, and much of it can be expected to die.

On the somewhat lighter side, a recent report of the U. S. Department of Commerce suggests that even though there may be fewer congressmen in Europe this year, there will be no lack of ordinary

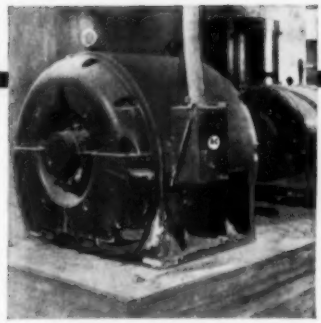
(*Continued on page* 92)

One of the many reasons why **ALLIS-CHALMERS MOTORS** operate dependably in the

ROCK PRODUCTS INDUSTRY



Motor Bearing is pressure-equalized with vent



Driving compressor on pneumatic cement conveyor.

SHAFT seals and a pressure-equalizing vent give double protection against oil leakage from this Allis-Chalmers motor bearing. First, seals keep oil inside the enclosure. Second, the pressure-equalizing vent chamber maintains atmospheric pressure at the inboard side of the bearing, so that fan action won't pull oil vapors out of bearing, under any conditions. This double protection assures oil-free motor interior and drip-free operation.

Accessible, Too!

Motor inspection is easy with capsule-type bearing housings. Upper halves of motor end shield and inner air baffle can be removed without opening the bearing enclosure or disturbing bearing alignment.

For details on these and other features of Allis-Chalmers motors, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5475

KENNEDY Equipment
Helps Build the Highways and the Dams of Today!

If you need crushing equipment, grinding mills, screens, conveyors . . . any type of machinery used in the wet or dry production and preparation of aggregates, whether it be hard rock or sand and gravel deposit . . . look to Kennedy! These typical Kennedy installations are designed to produce peak capacities.

All Kennedy Machinery and Equipment is engineered and built to meet specific requirements. The experience and advice of our engineers is at your disposal in choosing the equipment best suited to meet any given assignment.

General view of M & M STONE CO. at Harleysville, Pa. showing K V S Swing Jaw and Gyratory Crusher, Double Deck Vibrating Screens and Heavy Duty Rock Feeders in operation.

Send for Bulletin describing KVS Machinery and Equipment

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION
TWO PARK AVENUE, NEW YORK 16, N.Y. • FACTORY, DANVILLE, PA.

# of Tomorrow

AGGREGATE PLANT FOR SARIYAR DAM, TURKEY, showing secondary crusher house and conveyor system. Complete aggregate plant supplied by Kennedy-Van Saun.

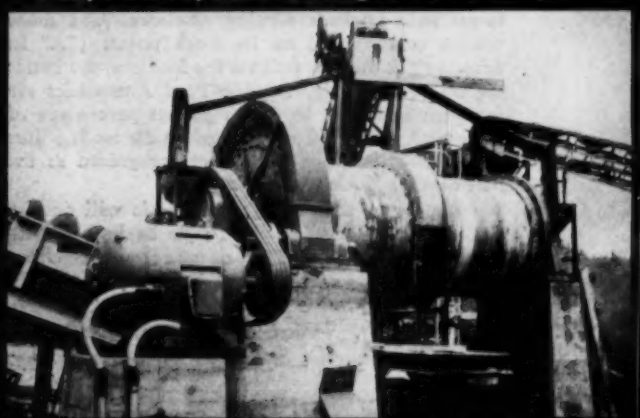
LAKE ONTARIO PORTLAND CEMENT CO., PICTON, ONT. 6,000 ton per day aggregate plant designed for marine and land shipments. Plant also supplies cement rock for 5,000 bbl. cement plant nearby.

VENDA NOVA DAM, PORTUGAL. Crushing, screening and sand making plant . . . capacity, 400 tons per hour. Designed and furnished by Kennedy-Van Saun.

KENNEDY PRODUCTS

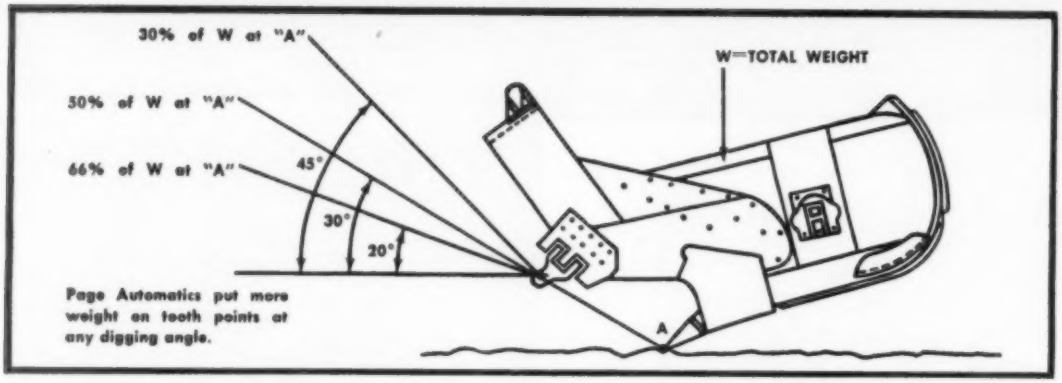
- Gyratory Crushers
- Swing Jaw Crushers
- Slugger Rolls
- Ball Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
- Preheaters, Deheaters
- Fans, Blowers
- Hoists, Conveyors
- Classifiers
- Pneumatic Transport Systems
- Dust Collectors
- Complete Cement Plants
- Complete Lime Plants
- Waste Heat Boilers
- Pulverized Coal Firing Systems

OTISVILLE SAND AND GRAVEL CO., CUDDEBACKVILLE, N.Y. 200 tons per hour sand and gravel plant equipped with Kennedy overhead eccentric Jaw Crusher; gearless gyratory secondary and tertiary crusher, vibrating screens and conveyors.



REFRACTORY SAND COMPANY, ANDREAS, PA. 5′ x 12′ Kennedy center peripheral discharge Rod Mill. Used for accurate sizing of commercial and refractory sand.

And it's DISTRIBUTION of WEIGHT That Makes A Bucket Dig



Regardless of all other arguments, the only practical way to judge and buy a dragline bucket is on its *digging ability*. If a bucket won't dig, or digs with difficulty, it is a poor investment in production.

Balance—the distribution of weight—is an important factor in a bucket's digging efficiency. The more weight concentrated on its tooth points ("A" in drawing) at the first pull on the loadline, the better the bucket will dig. Because Page Automatics are designed and built so that a greater percentage of their total weight is concentrated on the tooth points *at any loadline angle*, they are recognized as the best digging bucket on the market.

We can prove that a Page Automatic will out-dig and outperform ordinary old style buckets and increase yardage up to 25% *on your own machine*. Ask for details on a demonstration today. *Write for Bucket Catalog GPB554.*

PAGE ENGINEERING COMPANY
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Page

Automatic Dragline Buckets
Walking Draglines

If it's a PAGE... *It* DIGS

B-3109

SIX SIZES—½ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

FALK ALL-STEEL Shaft Mounted Drives

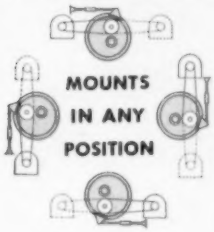
Wherever you require a highly efficient, economical speed reducing unit to fit into a limited space, the FALK All-Steel Shaft Mounted Drive meets your needs perfectly. This rugged, compact reducer mounts directly on the driven shaft and is driven through V-belt or chain drive from any convenient rotating power source.

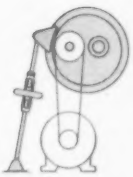
It's hard to match the versatility of a Falk Shaft Mounted Drive. You can choose a single or double reduction unit and use it with any of the many possible sheave or sprocket ratios to obtain almost any specified speed between 420 and 10 rpm. Equally important, the standard Falk Shaft Mounted Drive is available for horizontal and vertical application. Delivery is immediate, installation is quick and easy.

These units are completely FALK-designed and FALK-built for a long life of dependable, trouble-free service. *Precision-cut helical gears of highest efficiency* are employed for efficient, quiet operation.

Always available promptly from factory and distributor stocks, from *coast to coast*. For details, ask your Falk Representative or Distributor—or write for **Bulletin 7101.**

A FEW OF THE MANY APPLICATION FEATURES





VARIABLE SPEEDS through use of variable-pitch sheaves—automatic belt adjustment with tie-rod adjustment

OVERLOAD RELEASE that will slacken belts and cut off power if overload occurs

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

Manufacturers of

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
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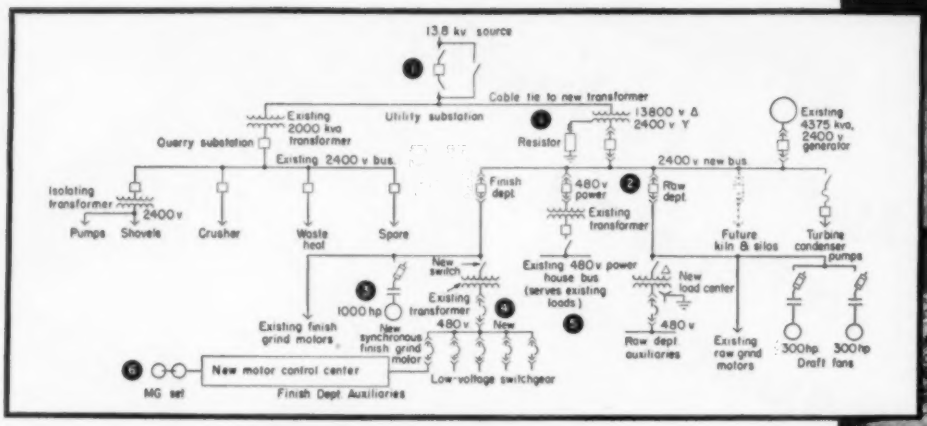
- Steel Castings
- Weldments
- Contract Machining

FALK

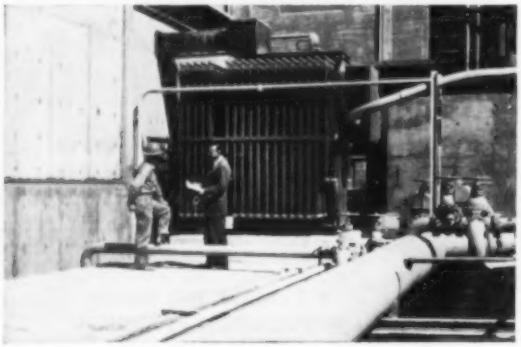
...a good name in industry

ENGINEERING REPORTS:

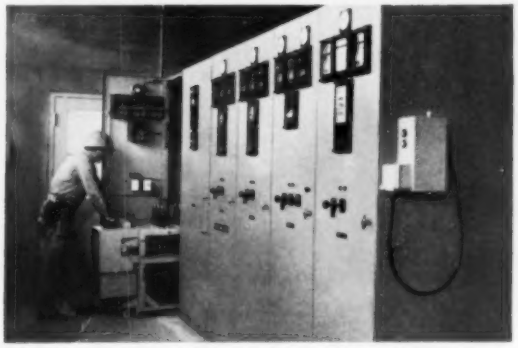
MODERNIZATION of plant electrical system is shown in one-line diagram, keyed to photos.



1 MINIMUM SHORT CIRCUIT DUTY on 2400-volt bus is provided by high impedance characteristic of new 5000-kva transformer. Neutral resistance grounding extends life expectancy of plant's 2400-volt equipment.



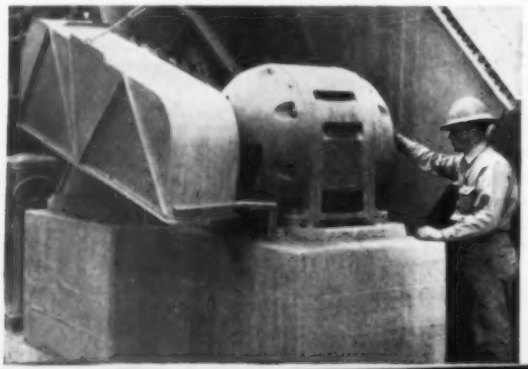
2 DUST PROBLEMS MINIMIZED by construction of pressurized switchgear room, housing new G-E metal-clad switchgear, which is throat connected through wall to adjacent outdoor G-E 5000-kva transformer.



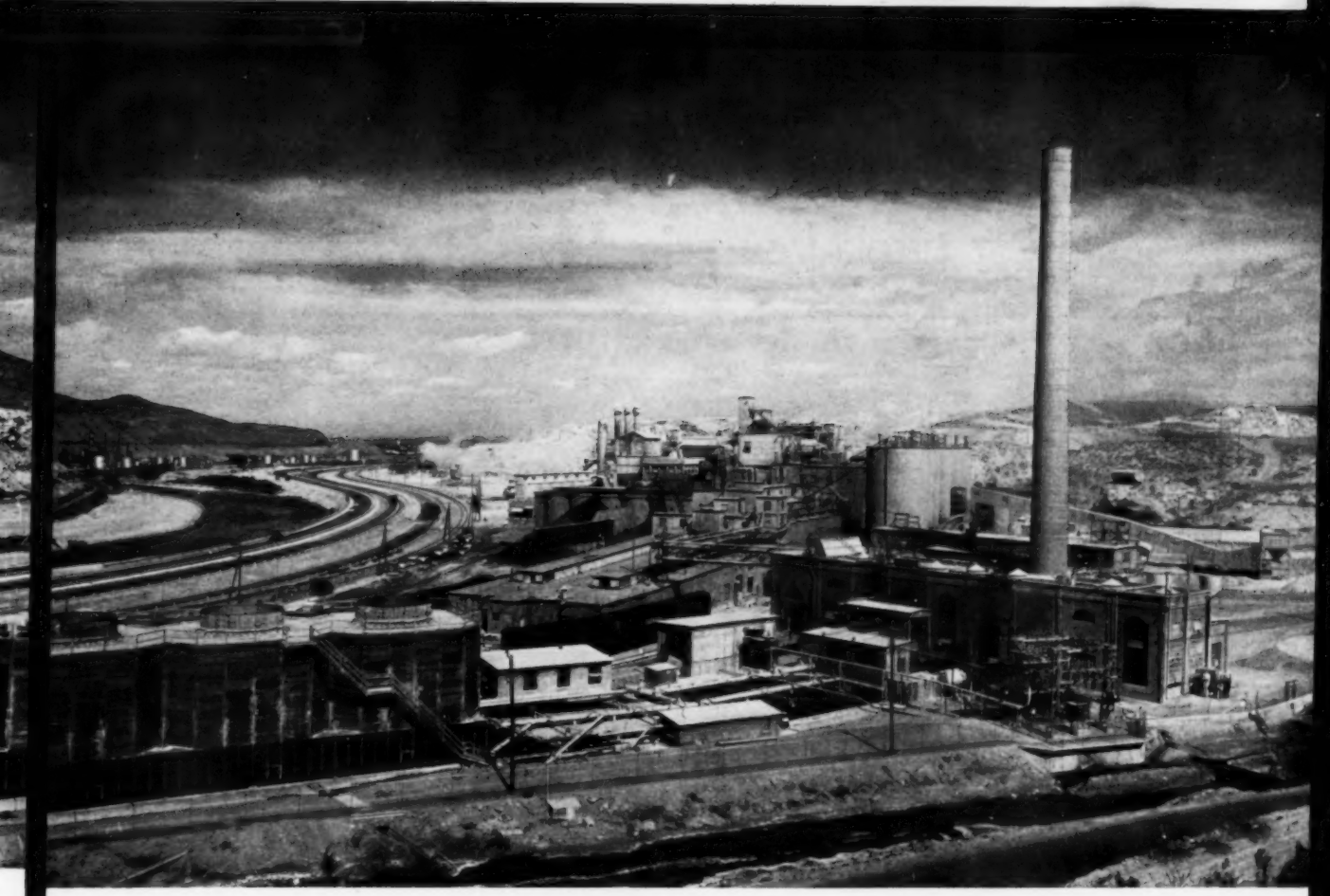
3 HEAVY LOAD STARTING for new grinding mills, powered by G-E 1000-hp, 2300-v, 180-rpm synchronous motors, is furnished by relating torque-speed characteristics of mill to those of motor and power supply system.

4 MODERNIZATION of finish dept's. 480-v supply was achieved by relocating existing 2400–480-volt transformers outdoors. Drawout switchgear with air circuit breakers provides safer, convenient power distribution.

5 DUST CONTROL, always critical in cement plants, is emphasized by arid climate. This rugged 150-hp, 2300-volt Tri-Clad* a-c motor drives fan for one of plant's numerous dust collectors. *Registered trade mark of General Electric Co.



6 DEPENDABLE EXCITATION for 1000-hp synchronous ball mill motor is furnished by General Electric motor-generator set, comprised of direct-current generator driven by 30-hp Tri-Clad alternating current motor.



At a large Southwest cement plant . . .

General Electric engineers, equipment help expand facilities, modernize power system

DISCUSSING new system—laid out jointly by G-E application engineers and cement company engineers—are plant engineer, electrical foreman and General Electric sales engineer, G. R. Yelderman (r).

As part of a multi-million-dollar company expansion program, one of the large cement plants in the Southwest* recently completed modernization of production facilities and the electrical distribution system.

General Electric system engineers, working on the scene with plant engineers, helped design and install the remodeled electrical system, synchronizing two separate power sources into a flexible power distribution system.

PRIOR TO EXPANSION, the plant generated a portion of its own power needs and purchased the remainder from the utility. Changes in the kiln department reduced the amount of steam available for the plant's power generation system and necessitated an increase in the purchased power. To handle this increased incoming power, a General Electric substation was installed, consisting of a 15-kv power circuit breaker, and a 5000-kva medium transformer to step down voltage from 13.8-kv to 2.4-kv. In addition, open-type s[illegible]ar was replaced by Gener[illegible] enclosed metal-clad swit[illegible]

WHEN YOU MODERN[illegible] your cement plant fa[illegible] Electric engineer[illegible] can wor[illegible] nearest[illegible] early[illegible] Ge[illegible]

Engineered Electrical Systems fo[illegible]

GENERAL [illegible]

Actual road tests prove Dodge outpulls "other two" low-priced trucks by 32%

Dodge gives you *Extra Pull* . . . cuts running time and maintenance costs

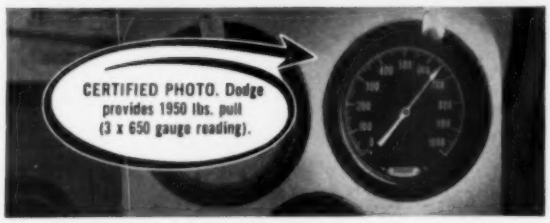
Here is definite proof that Dodge gives you a big power advantage that will pay off on your hauling jobs.

All three low-priced trucks were recently compared side by side in a grueling series of performance tests. The dynamometer test shown here is only one of them. And in each test . . . *climbing power* . . . *passing power* . . . *pulling power* . . . Dodge proved the outstanding truck of the low-priced three.

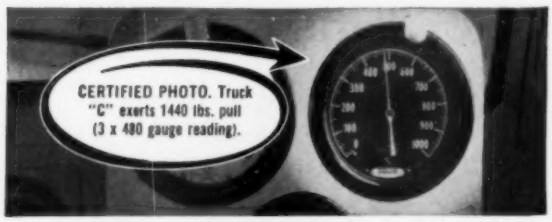
Extra power does it. From 204- to 232-hp. V-8's, Dodge *Power Giants* deliver the extra power you need to handle your hauling jobs faster, with less engine strain. Naturally, less strain means less wear, fewer repairs as you pile on the miles.

Proof for yourself. Certified results of all the comparison tests are in your Dodge dealer's showroom. Check them over and we think you'll be convinced your next truck should be a Dodge.

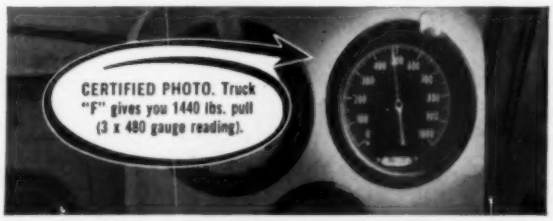
DODGE
Power Giants



DODGE and competitive trucks were tested for pulling power by towing a special dynamometer truck. Gauges measure maximum pulling force exerted. To convert this force into pounds, gauge reading is multiplied by three.



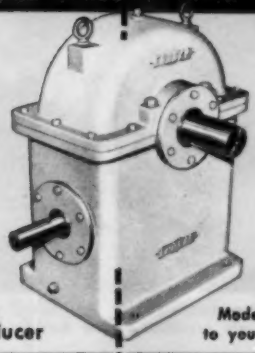
TRUCK C, pulling the same dynamometer truck as the Dodge, was unable to equal the Power Giant mark in repeated tries. Gauges show Dodge outpulled Truck C by 32%.



TRUCK F in its turn pitted all its pulling power against the Dodge, to no avail. The sealed, accurate gauges reveal clearly that Dodge offers most "pull power" of the low-priced 3.

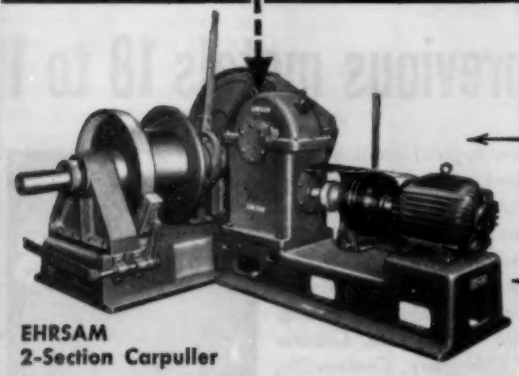
MOST POWER OF THE LOW-PRICED 3

for every Class of Service... EHRSAM



Style W Speed Reducer

9 Standard Models—Also built to your specification



EHRSAM 2-Section Carpuller

Handles, spots all types freight cars on spurs, sidings. In two sections, easily assembled. Manual or remote control. Full power, torque range. *Get detailed specifications!*

SPEED REDUCERS TIE POWER to LOAD with GREATER EFFICIENCY

EHRSAM'S new Style W Speed Reducers deliver highest possible work efficiency to the job. You can use these tough, compact units in a complete range of service: *normal, intermittent and heaviest shock-load.* (We use this new Speed Reducer in special-application units, such as the EHRSAM 2-Section Carpuller.) New design features include alloy steel shafts, precision-ground steel worm and alloyed bronze gear; and all castings of extra-tough EHRSAM Micrometal. The new EHRSAM Style W Speed Reducers give you increased operating efficiency, reliable protection to expensive equipment throughout your plant.

The new Style W Speed Reducer is the rugged, efficient heart of the EHRSAM Carpuller

Write for Complete Catalogs, full specifications

EHRSAM®

Over 80 Years of Dependable Service

THE J. B. EHRSAM & SONS MFG. CO.

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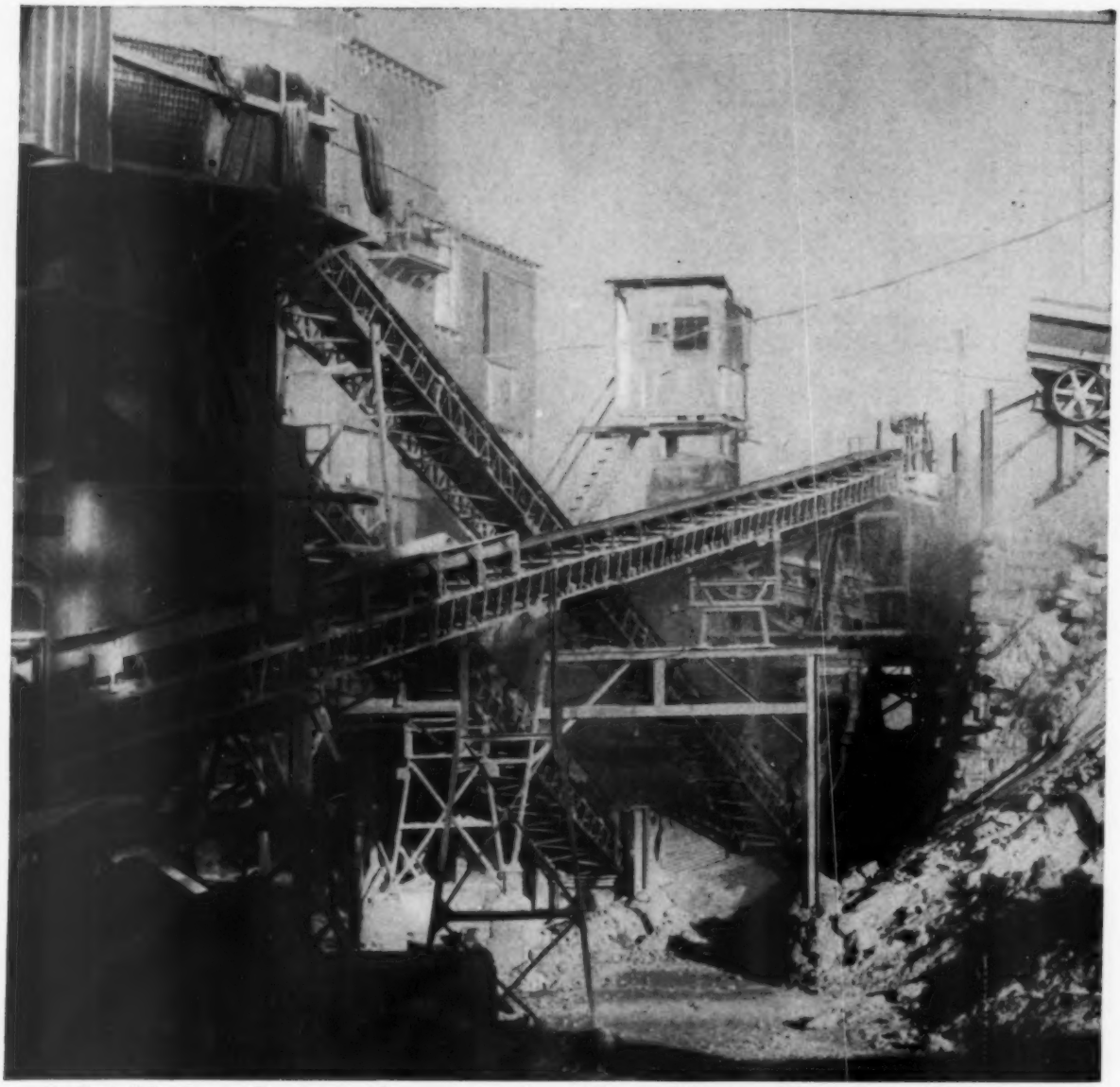
SALES OFFICES: Atlanta, Georgia; Denver, Colorado; Kansas City, Kansas
WEST COAST: Ehrsam Pacific, Inc., Riverside, California



At Bradford Hills Quarry, Downingtown, Pa., equipment of Lukens "T-1" steel of 321 min. Brinell hardness now handles 1000 tons of limestone daily—so far has lasted more than 18 times as long as metals previously used for the same purpose.

Lukens "T-1" Steel outlasts previous metals 18 to 1

TRADEMARK

Maintenance and replacement costs dropped sharply in chute liners, impact crusher caps, and similar parts when Bradford Hills Quarry switched to Lukens "T-1" steel. These critical parts once wore out in a month. Now they show little or no wear *after 18 months.*

Whether you handle stone, coal, or metal ores, Lukens "T-1" steel in areas hardest hit by punishing impact and abrasion will save you money too. Wear plates, dredge pump liners, storage bins, and fly-ash collectors are just a few typical applications.

Lukens "T-1" steel retains its remarkable combination of hardness and toughness at temperatures well below zero. *Look into it now. Write for informative illustrated booklet, "Lukens 'T-1' Steel." Address Manager, Marketing Service, Room 903, Lukens Steel Company, Coatesville, Pennsylvania.*

LUKENS ®

Helping industry choose steels that fit the job

News of the Industry

Chicago Quarry Operators Win Dismissals of Suits In 2-Year Legal Fight

Suits seeking $582,000 from the Material Service Corporation and the Dolese & Shepard Company, quarry operators in the Chicago area, for alleged damage to local homes due to blasting, were dismissed recently in Judge H. M. Fisher's circuit court in Chicago.

Residents of the LaGrange and Brookfield area began legal action two years ago. At that time the suit, which also named the Consumers Company and the Standard Lime and Cement Company, was dismissed in the circuit court on grounds that the allegations were insufficient to support a cause of action.

In 1956 the appellate court reversed the rulings, but upheld the denial of damages and the contention of the companies that damages could not be sought from three defendants in a single suit. (The suit on the injunction was remanded to the circuit court, and that suit is still pending.)

Separate damage suits were then filed against the quarry operators, and Judge Fisher held that the higher court's ruling on the damage counts of the first suit made the original judgment final.

Pacific Rock & Gravel Co. Buys Central Rock Products

According to an announcement released by Carlton M. Rogers, president of Pacific Rock and Gravel Company, Arcadia, Calif., this firm has acquired all of the stock of Central Rock Products Corporation, Upland, Calif.

Mr. Rogers stated that plans are under way for the improvement of the Central Rock property, including enlargement of the structures.

Other officers of Pacific Rock & Gravel include the following: L. G. Garzon, secretary; C. R. Langford, supervisor of production; and W. W. Alexander, chief engineer.

United States Lime Products Corporation, a subsidiary of the Flintkote Company, plans to build a new plant at Arroline, Nev., for the manufacture of oxygen steelmaking lime flux. The new plant's capacity will be more than 400 tons of lime products per day, according to I. J. Harvey Jr., board chairman of Flintkote.

Coming Events

August 25-31, 1957—Murray Bay, Canada. Semi-annual directors' meeting, National Sand and Gravel Association and National Ready Mixed Concrete Association. Manoir Richelieu.

September 9-12, 1957—Salt Lake City. American Mining Congress; 1957 Metal Mining and Industrial Minerals Convention.

October 9-11, 1957—New York. 40th annual meeting, National Slag Association. Plaza Hotel.

October 15-18, 1957—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association. The Greenbrier.

October 15 - 18, 1957 — Tampa, Fla. Annual meeting, Society of Mining Engineers, and Southeastern States Mining Conference. Hotel Hillsboro and Hotel Tampa Terrace.

October 17-19, 1957—Austin, Tex. Operating meeting, National Lime Association. Commodore Perry Hotel.

October 21-25, 1957—Chicago. 45th annual National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, Hamilton, and LaSalle Hotels

National Safety Council To Hold 45th Congress October 21-25 in Chicago

Preliminary plans have been laid for the 45th annual National Safety Congress and Exposition, which will be held from October 21 to 25 in Chicago.

Sessions on industrial safety have been scheduled for the Conrad Hilton, Congress, Morrison, and La Salle hotels. Other meetings will be held in the following locations: traffic safety, Congress; commercial vehicle and transit safety, La Salle; farm safety, Hamilton; school safety, Morrison; and home safety, Conrad Hilton.

Further information is available upon application to R. L. Forney, general secretary, National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

Ideal, Huron Sign Contracts For Wage Hikes, Benefits

At Denver, Colo., officers of the Ideal Cement Company and the United Cement, Lime and Gypsum Workers International recently signed a one-year labor contract. Under the terms of the agreement, Ideal will grant a 16½ cent-an-hour package wage increase, retroactive to May 1, for its 1,800 workers in 11 plants from Oregon to Louisiana.

By reaching an agreement with the union, Ideal escaped the strike difficulties which idled 16,000 workers in 75 cement plants—nearly one-half of all such operations in the country.

Negotiations between Ideal and the union had been in progress since April, but were recessed for several weeks.

Huron Portland Cement Company spokesmen at Alpena, Mich., also signed a contract with the union. The terms were said to be patterned on the same lines as those of the agreement accepted by Ideal. The 250 workers at Huron will receive a 14 cent hourly wage boost, retroactive to May 1. Increased shift differentials and overtime pay improvements bring the package deal to more than 17 cents an hour.

Contracts for May, 1957 Take Definite Upturn—Show 14% Gain Over 1956

Contracts for future construction in the United States rose sharply in May, according to the F. W. Dodge Corporation.

The total of $3,399,528,000 in May was 14 percent above the comparable month last year. One significant feature of the May figures is the fact that the dollar volume of contracts for one- and two-family houses was at the same level as in May, 1956. This is the first month in 1957 that the dollar volume of contracts for this type of building did not fall below the comparable 1956 level. The number of housing units represented by the May contracts was 101,741, down 5 percent from May, 1956.

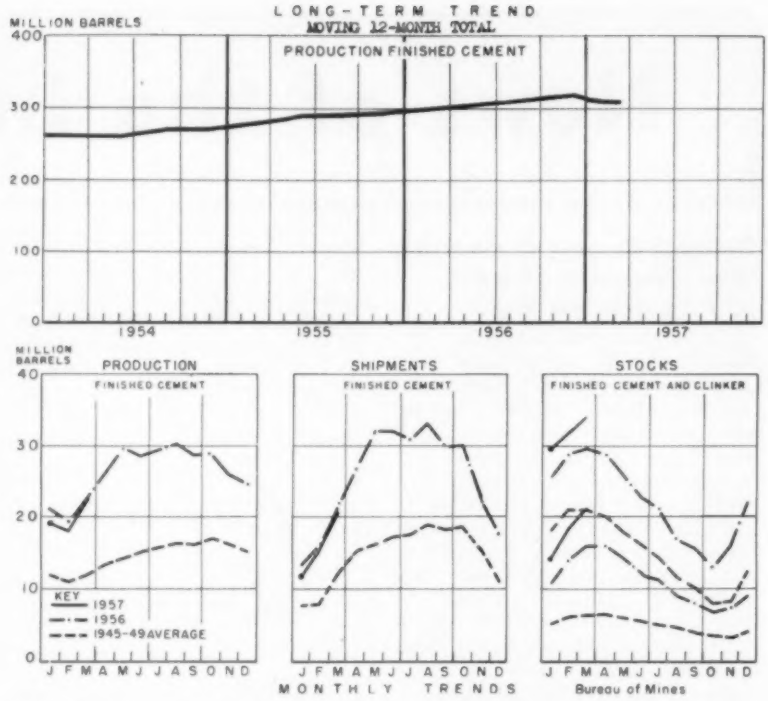
Contracts for non-residential buildings totaled $1,119,587,000, in May, 11 percent higher than a year ago. Substantial gains were registered for hospital buildings, educational and science buildings, commercial buildings, and manufacturing buildings.

Contracts for residential buildings in May (including multi-family units as well as one- and two-family houses) amounted to $1,297,258,000. This was only 1 percent below the comparable month last year, with the major part of the decline accounted for by large residential buildings.

Heavy engineering contracts in May totalled $982,683,000, which was 48 percent above a year ago. Large gains took place in contracts for streets and highway construction, as well as for electric light and power systems and water supply systems.

The substantial increases in May brought the cumulative total for the first 5 months of this year to $13,714,519,000 or 4 percent above the comparable period of 1956. Cumulative construction contract totals by categories for January through May, 1957, with percent changes from the corresponding 1956 period, are as follows: non-residential building, $4,784,299,000, up 3 percent; residential building, $5,328,265,000, down 5 percent; and heavy engineering, $3,601,955,000, up 20 percent.

Commenting on the May figures, Thomas S. Holden, Dodge vice-chairman, pointed out, "The long awaited improvement in housing activity appears to be in the offing. Liberalization of down-payment terms on government-insured mortgages, practically assured by recent enactments of the Senate and the House of Representatives, should give a further boost to residential activity during the remainder of the year. Non-residential building and heavy engineering continue strong, as has been quite generally expected."



SUMMARY—Production of finished portland cement in March, 1957, as reported to the U.S. Bureau of Mines, totaled 22,642,000 barrels, a decrease of 3 percent from March, 1956. Mill shipments in March, 1957, totaled 20,551,000 barrels, a decrease of 8 percent, compared with March, 1956. Stocks of 34,267,000 barrels of finished portland cement on hand March 31, 1957, were 15 percent more than those on hand March 31, 1956. Clinker production during March, 1957, totaled 25,617,000 barrels, a decrease of 1 percent from the March, 1956, figure.

PRODUCTION—One hundred and sixty-two (162) plants in 37 states and Puerto Rico reported a production of 22,642,000 barrels of finished portland cement during March, 1957, compared with 23,386,000 barrels in March, 1956.

Clinker production during March, 1957, was 25,617,000 barrels, compared with 25,811,000 barrels during the same month last year.

Production of high-early-strength portland cement in March, 1957, totaled 1,163,000 barrels, an increase of 10 percent over the March, 1956, production.

Production of prepared masonry cement was 1,064,000 barrels during March, 1957, a decrease of 21 percent from the March, 1956, production.

SHIPMENTS—Mill shipments of finished portland cement for March, 1957, totaled 20,551,000 barrels, compared to 22,222,000 barrels in March, 1956.

In March, 1957, shipments were higher in nine (9) districts and lower in fourteen (14) districts than in March, 1956. The greatest increases were in the eastern Pennsylvania-Maryland and the New York-Maine districts. The greatest decreases were in the Iowa, eastern Missouri-Minnesota-South Dakota, and the Kansas districts.

Mill shipments of high-early-strength portland cement in March, 1957, totaled 1,067,000 barrels, an increase of 17 percent over the 915,000 barrels shipped in March, 1956. Over half of these shipments were from mills in three (3) districts, eastern Pennsylvania-Maryland, Michigan, and Alabama. No shipments were made from mills in Puerto Rico.

Mill shipments of prepared masonry cement in March, 1957, totaled 1,076,000 barrels, a decrease of 7 percent from the 1,156,000 barrels shipped in March, 1956. Nearly two-thirds of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels, although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 34,267,000 barrels of finished portland cement were on hand on March 31, 1957, an increase of 15 percent over the 29,868,000 barrels on hand on March 31, 1956. Stocks of clinker increased 33 percent from 16,151,000 barrels on March 31, 1956, to 21,431,000 barrels on March 31, 1957.

FIRST THREE MONTHS—For the January-March period this year, the volume of production of finished cement amounted to 59,789 tons, compared with 64,404 tons in the same period of 1956. Total shipments for the first three months of 1957 are reported as 47,459 tons; in 1956 (January-March period) the total shipments were 51,424 tons.

H. L. Peden and Mack Ashmore of Greenville, S. C., have purchased Wing's Quarry, Travelers Rest, S. C. The quarry comprises 102 acres.

"With our EAGLE MATERIAL WASHING AND CLASSIFYING SET UP, *we're prepared for all comers"*, SAYS MOONEY BROS. SUPPLY CO., NEW CASTLE, PA.

Mooney Bros. Supply Co., established in 1925, requires a variety of aggregates for their own operations and for contractors and road builders in the area. They operate their own fleet of 12 ready-mix concrete trucks a concrete block plant, and hot or cold bituminous concrete plant. They also operate a quarry and do excavating and trucking.

To meet their requirements for various specifications of sand, gravel or aggregate the six Mooney brothers depend on an EAGLE Washing-Classifying-Dehydrating Section at their sand and gravel plant. It consists of a 20' Water Scalping-Classifying Tank with Power-Operated Bleeder Valves and a 3-Cell Collecting-Blending Flume and two Single Screw Fine Material Washer-Classifier-Dehydrators; each handling a different gradation. With this set up they are prepared for all comers, they report.

EAGLE has long specialized in aggregate processing equipment—Eagle has the broadest line of equipment to meet every need. You can profit from Eagle's experience. There's an Eagle factory-trained distributor nearby to serve you.

SEND FOR CATALOG AND NAME OF USER NEAR YOU!

SINCE 1872

EIW

EAGLE IRON WORKS

The EAGLE LINE

EAGLE IRON WORKS

133 HOLCOMB AVE., DES MOINES, IOWA

N.W. States Portland Appeal in Higher Court Loses Tax Decision

In a 5 to 2 split decision, the Minnesota Supreme Court ruled recently that the Northwestern States Portland Cement Company of Mason City, Iowa, must pay the state $102,536 in income taxes, penalties, and interest for the years 1933 through 1948.

According to Associate Justice LeRoy Matson, the state may tax that portion of the company's net total income which is allocable to Minnesota, although its business within the state consists exclusively of interstate commerce (Northwestern States has customers in Minnesota, North Dakota, South Dakota, Nebraska, Iowa, and Wisconsin.)

This ruling upheld an adverse decision by the District Court in Minneapolis. It is fully expected, according to company officials, that the case will be appealed to the United States Supreme Court.

Marble Cliff Quarries Co. Acquires Shawnee Stone Plant

Marble Cliff Quarries Company, Columbus, Ohio, has purchased the assets of the Shawnee Stone Company at Powell, Ohio. The operation at Shawnee will be known as the Shawnee Division of Marble Cliff Quarries. Announcement of the acquisition was made by Richard Ninde, president of Marble Cliff.

Shawnee Stone Company was owned jointly by James Lyons and Clyde Owens.

Cement Strike Receding As Contracts Are Signed

Contracts have been signed by representatives of the United Cement, Lime and Gypsum Workers International and the Marquette Cement Manufacturing Company, Missouri Portland Cement Company, Universal Atlas Cement Company, and North American Cement Corporation, and the country-wide strike shows signs of tapering off.

Marquette workers won pay increases and other benefits amounting to an average of 16 cents an hour. Missouri Portland employees were granted total increases costing the company 16.8 cents an hour at St. Louis and 15.9 cents at Kansas City.

The Universal Atlas contract affected only the plant at Northampton, Pa., but it is expected to provide a pattern for contracts involving five other Atlas plants negotiating separately with the union. Management settled for an 11 cent-an-hour increase at Northampton.

A.I.M.E. Mining Engineers Nominate S. D. Michaelson Society President for 1958

Stanley D. Michaelson of Salt Lake City, Utah, has been nominated 1958 president of the Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Mr. Michaelson, chief engineer of the Western Mining Division, Kennecott Copper Corporation, will also serve as a director of A.I.M.E.

The current president of the Society is Elmer A. Jones, Bonne Terre, Mo., manager of the Southeast Missouri Division, St. Joseph Lead Company. Mr. Jones was recently nominated as a director of A.I.M.E.

DOUGLAS C. GARDNER has been appointed assistant division sales manager of the Toledo Sales Division of the Medusa Portland Cement Company, Cleveland Heights, Ohio.

C. E. HEDRICK has been appointed assistant sales director of the Florida Portland Cement Division, General Portland Cement Company, Chicago, Ill., with headquarters at Tampa, Fla.

Carolina Big Tire Recapping AVE THOUAND

Earthmover Sure Grip
Sizes 1200x24 through 2400x29

LASTS like a New Tire
COSTS half as much

DON'T SCRAP that worn big tire! . . . Carolina Recapping Service can give it the utility of a brand new casing, at a 50% saving.

Carolina specializes in this valuable tire restoration service for quarry operators, contractors, and strip mine operators.

We go anywhere, anytime, for pickup and delivery. Expert on-the-job service available to reduce costly down-time.

There are more than 2000 Carolina service dealers in 30 states and some foreign countries. They can help you cut costs per mile and per ton.

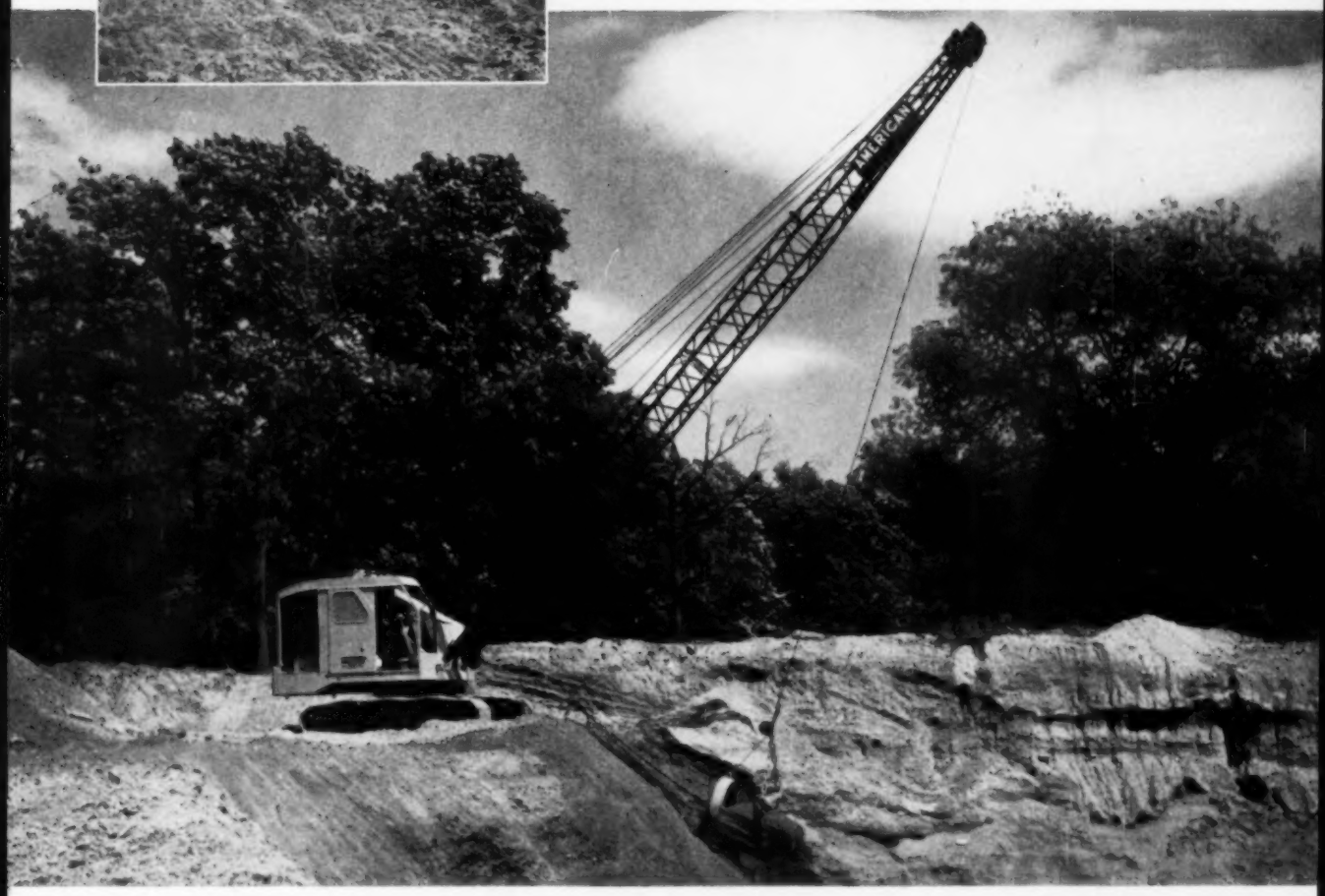
We have earthmover tire bargains, all sizes.

Full details on request

CAROLINA TIRE COMPANY
232 N. MAIN ST. • SALISBURY, N.C. • PHONE 5200

16 YEARS ON THE JOB PROVES AMERICAN DURABILITY

Sixteen year old dragline, left, was Howard Arnold Company's first American. Last year the firm added American's latest 300 Series Dragline, shown below. A decade and a half of trouble-free performance proved to the owner that the rugged design of American Cranes pays off!



Howard Arnold worked a tough American Dragline in his sand and gravel pits for 15 years. He had so little trouble that last year he bought a second American. He says, "The performance of our first American was the chief reason for buying the new one. It was bought in 1941 and is still running perfectly. Until recently we hadn't made any major repairs on it. We still keep it busy at our other pit."

About his new American 300 Series Dragline, Arnold says, "This machine let us revise our operations to the extent that we can handle material faster and get more thorough coverage of the pit. The longer boom helps, and the American handles it very well." Equipped with one-yard buckets, Arnold's Americans work in the pit, feed crushers and load trucks from stockpiles.

Successful performance reports of American Cranes on the job, like this one of the Howard Arnold Company of Fairbury, Ill., are typical! Find out for yourself . . . talk to owners and operators — watch American Cranes *at work!* Ask your nearest distributor to show you American Crawler and Truck Cranes on the job. With any front — dragline, shovel, clamshell, backhoe or crane boom — in any capacity from ½-yard, 12½ tons on up, you'll see, in person, why American is the fastest growing line in the country!

AMERICAN HOIST
and Derrick Company

Saint Paul 7, Minnesota

Michigan Model 175A loads crushed stone into stationary hopper at end of 480-ft conveyor leading to concrete batch plant.

6,750 cu ft of concrete per hour,

from automatic batching system fed by Michigan Tractor Shovels,

paces Peter Kiewit paving crew

Peter Kiewit Sons' Company, Omaha, started construction of the new Minot (North Dakota) Air Force Base as originally planned for jet interceptors. But when the Air Force decided to base B-52-type heavy bombers there as well, a longer, wider, stronger runway became a sudden necessity. Modified plans doubled width to 300 ft, extended length well beyond the original 8100 ft. Key installation was a 50 ft ribbon of concrete, 16 inches deep, centered along the full length of the runway. To finish the greatly enlarged contract ahead of penalty date, concrete pours had to average 2,000 cubic yards per 8-hour day.

Kiewit owns 16 Michigans, two used here

Faced with this tight schedule, the Kiewit crew turned to an automatic concrete batching plant *and modern high-speed material feeding methods.* According to R. D. Wilson, Kiewit Area Manager, the *entire* paving

Normal carry position, slightly above ground level, eliminates possibility of stone-crushing dozing action; yet permits high-speed travel without spillage-loss.

operation was planned around the known productive ability of Michigan Tractor Shovels. Two of Kiewit's 16 Michigans, both big Model 175As, were brought in to feed the batching plant via mobile and stationary hoppers and automatic conveyors. Handling *3,200 tons of aggregate per day,* these 2¾ yard Michigans had to deliver heaped buckets every time—and they did! Their big loads, *delivered fast,* kept plant at peak production of 180 batches (each 37.4 cu ft) per hour, day after day . . . making the job possible—*and profitable!*

Michigans eliminate pulverizing problem

One of the major advantages of the Michigans was that, despite their speed, the big low-pressure tires compacted—but never pulverized—the stone underfoot. Thus Kiewit eliminated a major problem—the crushing and grinding of aggregates often experienced when crawlers are used. Trucks delivering the stone dumped at the edge of the air field; there the Michigans took over. These fast, highly-maneuverable units loaded the material, carried it up steep ramps to build and maintain huge stockpiles.

"Fast, dependable, easy to repair"

"Another reason we put Michigans on the job was we knew they require very little maintenance," says Paving Supt Max Woodard. "When repairs *are* necessary, excellent accessibility makes it an easy job. We've also found these machines have enough power to do anything we want. They're fast, too. Our operators like the way they handle. *We* like the way they kept those hoppers full. Fuel? One tank of diesel oil (50 gallons) keeps them going all day long! That torque converter's good and the power-shift transmission is a big improvement over other machines. Michigans have done a nice job for us."

Make this test

Chances are, Michigans can do a "nice job" for *you,* too, no matter *what* bulk materials you have to move. But there's an easy way to find out first hand! Simply ask your Michigan Distributor for a free demonstration—no obligation, of course. If what you see looks good enough to buy—and we think it will—your distributor has a wide range of purchase plans . . . including Clark's popular Lease-Purchase which lets you put one or more Michigans to work *without spending a cent of capital.*

Clean design of bucket mechanism gives operator excellent visibility when dumping into hopper.

Another of Peter Kiewit's Michigans serves as all-around handyman on company's Indiana Turnpike contract. This 102 hp 2 yd Model 125A lifts up to 11,000 lbs, carries 5,500 lbs at 4 mph.

CLARK® EQUIPMENT

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road,
Benton Harbor 43, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

A.I.M.E Mining Engineers Name John Cameron Fox To Position of Secretary

John Cameron Fox has been appointed secretary of the Society of Mining Engineers of the American

John C. Fox

Institute of Mining, Metallurgical, and Petroleum Engineers. Mr. Fox succeeds Arnold Buzzalini, who has resigned to become a consulting geologist.

Prior to accepting his present position with A.I.M.E., Mr. Fox was assistant manager of the Mining Division of the American Metal Company, Ltd. His extensive career in the field of mining also includes his association with the New Jersey Zinc Company as mine engineer, E. I. du Pont de Nemours & Company as technical representative for the Explosive Department, and an assignment in Cuba for the Nicaro Nickel Company, a subsidiary of the Freeport Sulphur Company.

Mr. Fox is a graduate of the School of Mines, Columbia University, where he also taught for four years. Well known in his field as a writer, he was at one time editor of *Mining Congress Journal* and on the staff of the *Canadian Mining Journal*.

Gypsum Production Drops 23% Below First Quarter of 1956

Domestic mine production of crude gypsum during the first quarter of 1957, as reported to the Bureau of Mines, Department of the Interior, totaled 1,987,125 short tons, 23 percent below the first quarter of the preceding year. Imports declined 5 percent. Output of calcined gypsum, which totaled 1,782,887 tons, was 19 percent lower than the first quarter of 1956. The total production of uncalcined gypsum declined 5 percent due primarily to a drop of 8 percent in the production of cement retarder. Agricultural gypsum and gypsum for fillers and unclassified uses remained virtually unchanged.

Sales of building and industrial plasters were 1 and 2 percent lower, respectively, than in the corresponding period of last year. All industrial plasters with the exception of pottery and dental and orthopedic plasters increased, whereas in the building category, increases were reported for only sanded and premixed perlite, roof-deck, and "other" plasters.

L. L. Van Nest of Penn-Dixie Dies After Long Illness

L. L. Van Nest, 55, vice-president and general sales manager of Penn-Dixie Cement Corporation, died on July 4 at a New Rochelle, N. Y., hospital after a protracted illness.

Mr. Van Nest joined Lehigh Portland Cement Company as a salesman in 1927. He was a district sales manager for that company from 1939

L. L. Van Nest

until 1941, when he joined Penn-Dixie as assistant sales manager in New York. He was appointed assistant general sales manager for Penn-Dixie in 1945 and elected vice-president and general sales manager in April, 1956.

W. P. Morris, former executive vice-president of the Duval Sulphur & Potash Company has been elected president to succeed the late George F. Zoffman.

Cement & Quarry Section Of Natl. Safety Council Reveals Congress Plans

The Executive Committee of the Cement, Quarry, and Mineral Aggregates Section of the National Safety Council held its spring meeting on May 20, 1957, at the Hotel Cleveland, Cleveland, Ohio. Howard Riefenstahl (Alpha Portland Cement Co.), general chairman, presided.

William Kipp (Universal Atlas Cement Co.), program chairman, announced that the following papers are scheduled for the National Safety Congress to be held in Chicago on October 22 and 23, 1957: *Job Interview Program of Universal Atlas Cement Co.; Fatalities in the C. Q. and M. A. Industries; Safer Blasting Through Engineering; Safety Disciplines; Personal Protective Equipment Program of Ideal Cement Co.; and Conveyor Safety.* Slides and/or movies will be featured.

The committee decided to inaugurate a safety campaign in 1958 for 100 percent locking out of machinery switches, bin gates, etc. Plans call for following this campaign with others involving personal protection and protective devices, such as hard hats, goggles, etc. The committee also discussed plans for developing a safety data sheet for all types of conveyors.

Missouri River Sand & Gravel Constructing Wharf, Levee

At Boonville, Mo., the Missouri River Sand and Gravel Company is constructing a wharf and levee 335 ft. long for its plant at this location. An area varying from 25 to 50 ft. wide and 11 ft. deep will be excavated behind the levee to increase storage capacity for sand.

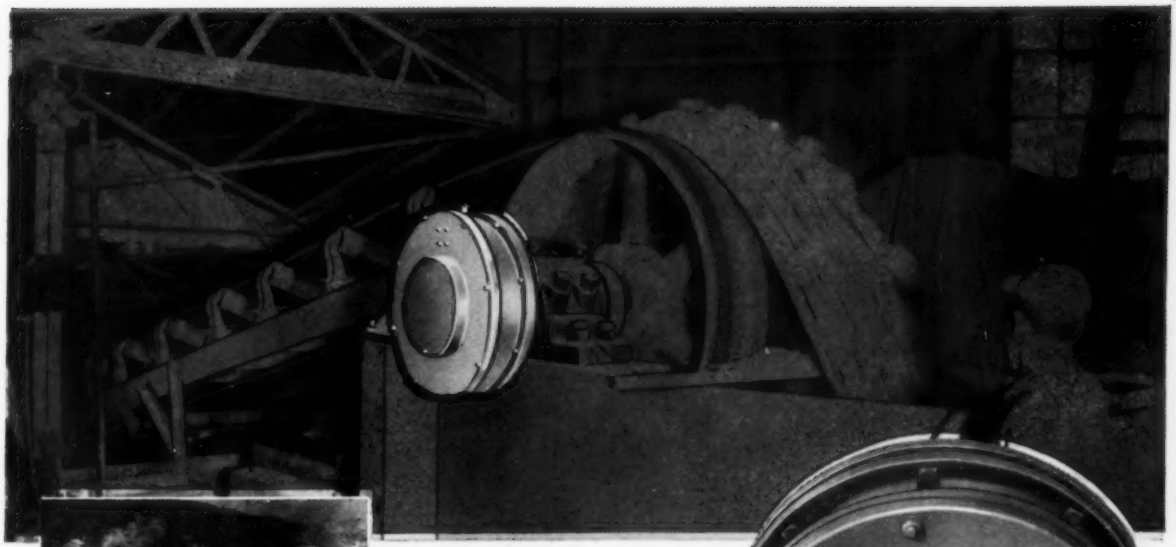
On the 14-ft. crown of the levee the company will operate a mobile crane for unloading barges. The river face of the levee will be paved with limestone to stabilize the bank.

Kyanite Begins Operations At Dillwyn, Va., Installation

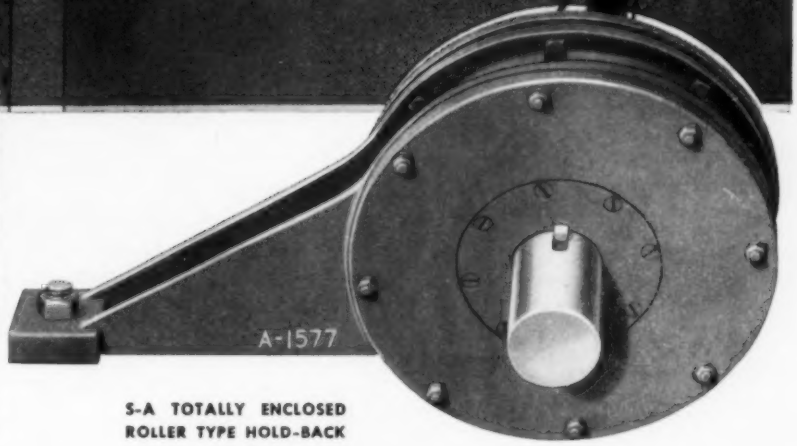
The new mine and mill of the Kyanite Mining Corporation, Cullen, Va., has been completed and is in full operation near Dillwyn, Va.

Construction of additional buildings will continue for some time. A modern office building and laboratory are planned for the near future.

Kyanite Mining Corporation produces kyanite and mullite at three plants. In the production of kyanite, concentrate is floated from the ore by means of froth flotation.

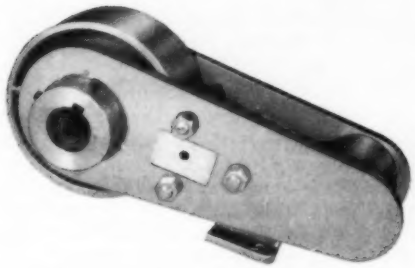


The Belt Conveyor, shown above is 48 inches wide and 1200 feet long. An S-A Totally Enclosed Hold-Back prevents a disastrous reversal of this heavily loaded belt during normal operating delays or in case of a power failure.



S-A TOTALLY ENCLOSED ROLLER TYPE HOLD-BACK

Prevent the reversal of conveyors and elevators with STEPHENS-ADAMSON TOTALLY ENCLOSED HOLD-BACKS!



S-A STANDARD ROLLER TYPE HOLD-BACK . . . provides all of the same outstanding advantages with the exception of the Totally Enclosed Design. Ruggedly constructed . . . economical . . . stocked for immediate delivery.

OUTSTANDING ADVANTAGES:

- Engages without shock . . . instantly holds . . . instantly releases when power is resumed.
- Eliminates flooding of feeder points . . . protects men and equipment.
- Balanced design . . . no ratchet to become fouled . . . quickly and easily installed . . . provides years of dependable, trouble-free operation . . . may be installed in any position!
- Totally enclosed design prevents entry of dust and dirt . . . economical to purchase, operate and maintain.
- Available in bore sizes from 1 7/16" to 12" . . . stocked for immediate delivery.

Write today for complete information . . . Request Catalog No. 557.

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
20 Ridgeway Ave. Aurora, Illinois

R. J. O'Heir, D. W. Gesler Named to Top Positions At Perlite Institute

Richard J. O'Heir has been promoted to the position of secretary-treasurer of the Perlite Institute, New York, N. Y., and David W. Gesler has joined the Institute as its new advertising and promotion director.

Mr. O'Heir, who formerly served as director, supervised the Institute's research and development projects for the last five years. He is now responsible for policy and administrative decisions.

Mr. Gesler will develop an extensive advertising and promotional campaign to broaden the various markets for perlite. He was previously engaged in sales promotion and communications.

Wyandotte Chemical Quarry Acquired by Huron Portland

Huron Portland Cement Company of Detroit, Mich., has bought the Wyandotte Chemical Corporation's mile-wide limestone quarry at Alpena, Mich., which has supplied Huron for 50 years.

The change of ownership was prompted by Huron Portland's desire to have its own source of limestone and Wyandotte Chemical's recent use of higher grade limestone, obtained from other sources.

The sale does not include ownership of the limestone-carrying fleet of the Wyandotte Transportation Company, a subsidiary of the chemical firm.

Saskatchewan Cement Corp. Sold to Inland Cement Co.

Directors of the Saskatchewan Cement Corporation, Ltd., Regina, Sask., Canada, voted unanimously to sell all the firm's assets to the Inland Cement Company, Ltd., of Edmonton, Alta. The offer was accepted by the directors of the latter. Saskatchewan must now obtain the approval of its shareholders, mortgage bondholders, and the government of Saskatchewan.

The price will be 291,250 shares of 6 percent participating preferred stock of Inland Cement, or about $6,000,000. A special meeting of Inland shareholders will be called to authorize an increase of capital.

Annual capacity of the Saskatchewan Cement Corp. is 1,100,000 bbl. This is a dry-process installation. Operation of the $8,000,000 Saskatchewan plant was begun last year. Inland operates a wet-process plant with a capacity of 2,000,000 bbl. per year. Management of the latter is expected to make important capital expenditures and improvements at the Regina plant. Sogemines, Ltd., Montreal, has a controlling interest in Inland.

Name Changes Announced For Six Houdaille Affiliates

Six companies, all affiliates of Houdaille Construction Materials, Inc., Morristown, N. J., will be operated under the name of the parent firm. They are as follows:

North Jersey Quarry Company; Consolidated Stone & Sand Company; Commonwealth Concrete Company; Seguine Bogert Company; Portland Sand & Gravel Company; and Hunterdon Stone & Sand Company.

All will use the name of Houdaille Construction Materials, Inc., and all except the first and last companies listed will be described as units of the parent organization.

Chemical Lime Co. Quarry Near Baker, Oreg., Producing

Chemical Lime Company's new quarry on Marble Creek, near Baker, Oreg., went into production recently, according to an announcement from the firm.

The burning plant is scheduled to go into production soon, and will produce burned lime, hydrated lime, and pulverized quick lime.

Quarry drilling has established a tested reserve of 3,000,000 tons, with a surveyed reserve of 6,000,000 tons. Mining will be done on 20-ft. bench levels in the steep face of the marble mountain.

Howard C. Pyle Nominated 1958 A.I.M.E. President-Elect

The American Institute of Mining, Metallurgical, and Petroleum Engineers has nominated Howard C. Pyle of Los Angeles president-elect in 1958.

Grover J. Holt, of Ishpeming, Mich., general manager of The Cleveland-Cliffs Iron Company, is the current president. Dr. Augustus B. Kinzel, New York, vice-president, Union Carbide & Carbon Corporation, research, is currently president-elect, and will become president of A.I.M.E. at its annual meeting in February, 1958, in New York.

Mr. Pyle's nomination was presented by the Society of Petroleum Engineers of A.I.M.E., the Society designated to nominate the 1959 president of A.I.M.E. The Society of Mining Engineers will designate the 1960 A.I.M.E. president; the Metallurgical Society will nominate the president for 1961.

S. W. Concrete Materials Appoints Bickel, Tracy To Executive Positions

George Bickel has been appointed president and W. F. Tracy vice-president in charge of production for the Southwest Concrete Materials Corporation, Little Rock, Ark.

Southwest Concrete Materials was recently organized to install plants for processing lightweight aggregate from clay; the firm will also manufacture prestressed, precast concrete products, and will process sand and gravel.

Mr. Bickel, formerly of Dallas, Tex., was associated with the Southwest Prestress Company of Dallas and Houston as an engineer. Previous to this position he had been sales manager and engineer for the Featherlite Corporation, Austin, Tex. He served as sales engineer from 1950 to 1953, when he became engineer and later also sales manager for Featherlite. In 1955 he became affiliated with the Stearns Manufacturing Company, Adrian, Mich., where he did research on lightweight aggregate. The following year he joined Southwest Prestress.

Mr. Tracy is in charge of the design and construction of the firm's $750,000 plant, which is being erected at Poyen, Ark. Products will include lightweight concrete aggregate materials, rock, stone, and sand and gravel.

Widely known in the South as a concrete materials authority, Mr. Tracy has been active in the concrete industry for the last 28 years. His experience includes association with the North Little Rock Sand Company and the New-Crush Stone Plant, also of North Little Rock.

Flintkote Plans Acquisition Of Kosmos Portland Cement

Flintkote Company, New York, N. Y., plans to acquire the Kosmos Portland Cement Company, Louisville, Ky., for an indicated price of about $16,000,000. Both companies have agreed in principle to the consolidation, and Flintkote shareholders will be asked to give their approval at a special meeting to be held in Boston on August 20.

The Kosmos plant, located outside of Louisville on the Ohio River, has an annual capacity of 2,000,000 bbl., producing cement for Kentucky and the southern areas of Illinois, Indiana, and Ohio.

A spokesman said that Kosmos would be able to supply cement to Flintkote plants at New Orleans, Chicago Heights, and an installation now under construction in Indiana.

WATCH FOR FIRESTONE WHEN THE BIG PUSH IS ON!

Firestone Rock Grips lead all tire choices where highways end—and big jobs begin!

Firestone Tubeless Rock Grips save time where you're pushing big projects. That's because of two great tread designs that carry your heavy equipment *over any terrain!* They eliminate your need for changing tires to match the job. You get the *full flotation* you need for sand and soft stuff. You get the *armored grip* you want for rough runs over broken rock. Safety-Tensioned *Gum-Dipped*® NYLON bodies combined with cut-resistant treads make these tires top choice for off-highway users. Your Firestone Sales Engineer can show you why you'll make them *your* top choice, too. Contact him today—through your local Firestone Dealer or Store.

ROCK GRIP WIDE BASE ROCK GRIP

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1957, The Firestone Tire & Rubber Company

3-Day Celebration Staged At C. Girardeau, Mo. To Honor Marquette Plant

On June 9, the residents of Cape Girardeau, Mo., and the surrounding area visited the recently completed plant of the Marquette Cement Manufacturing Company during an open house given by the firm. This event marked the opening of a three-day celebration in which the members of the community participated to honor the cement firm. About 1,500 persons toured the plant.

Representing the top executives of Marquette at the festivities were Walter A. Wecker, president; L. W. Saxby, V. J. Hanley, S. L. Cribari, C. E. Wuerpel, L. H. Vroman, and Paul Duncan — all vice-presidents; and others heading various branches of the organization.

Marquette's multimillion-dollar installation, a wet-process plant which replaces the former dry-process operation, has almost doubled cement output at Marquette's Cape Girardeau plant since it went into production a few months ago. Current total output has been 9,000 bbl. per 24-hr. day from the pushbutton installation and the old plant. Production of the 450- by 12-ft. kiln in the new plant is 4,000 bbl. per 24-hour day.

Western Gypsum Products Acquires Two B. C. Companies

Western Gypsum Products Ltd., Winnipeg, wholly-owned subsidiary of British Plaster Board (Holdings) Ltd. of London, has purchased two British Columbia companies for $2,000,000.

Western Gypsum has purchased Westroc Industries Ltd. Vancouver, for $1,000,000. Columbia Gypsum Company, with extensive gypsum deposits at Windermere in the East Kootenays and in the Spokane, Wash., area was also acquired, at a cost of $1,000,000.

Property of the Capilano Timber Company in Vancouver was purchased earlier, and a plant will be built on the site of the lumber mill.

Arkansas Cement Corp. Elects Officers, Directors

Arkansas Cement Corporation, a newly-formed concern at Little Rock, has elected officers and formed a board of directors. W. T. Murphy is chairman of the board. J. C. Hamilton, president of the Arkansas Louisiana Gas Co., Shreveport, La., is president of the new corporation. Other officers are Frank L. Holleman, secretary and treasurer; E. N. Henderson, vice-president; and Raymond H. Thornton Jr., assistant secretary and assistant treasurer.

Construction of the corporation's multimillion-dollar cement plant near Foreman, Ark., is scheduled to begin by October 1, 1957, and the date set for initial production is October 1, 1958. Engineering and construction work on the new plant is being undertaken by Kaiser Engineers, a division of Kaiser Industries, Oakland, Calif.

When completed, the $15,000,000 facility will have an annual capacity of 1,400,000 bbl.

Wells Lamson Quarry Opens $500,000 Crushing Plant

One of the largest stone crushing plants in New England has gone into production at the Wells Lamson Quarry in Websterville, Vt. The $500,000 operation is set up to produce eight sizes of stone, ranging from individual 300-lb. pieces down to fine dust, for use in all phases of roadbuilding.

The company's grout piles, estimated to contain from 3,000,000 to 4,000,000 tons of rock, furnish the raw material for the plant. Capacity is expected to reach 1,000 t.p.d., according to Maurice L. Kelley, president of Wells Lamson.

All crushing equipment, including two Hydrocone gyratory crushers, the screening equipment, electric motors, and V-belt drivers, were furnished by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Huron Portland Cement Co. Observes 50th Anniversary

The Huron Portland Cement Company is celebrating its golden anniversary this year. It was founded on January 26, 1907, in Detroit and now operates the largest single cement mill in the world at Alpena, Mich.

In 1956 a total of 24 kilns produced more than 25,000 bbl. of cement a day at the Alpena mill. Output will be increased further this year when two large new kilns, equipped with preheaters, go into production.

In the annual June safety rally, the Fairborn, Ohio, plant of the Southwestern Portland Cement Company, Los Angeles, Calif., rededicated its safety trophy for going through 1956 without a lost-time accident. The safety award was presented by P.C.A., represented by Ernest V. Apt, eastern district manager.

Industry Personalities

W. H. Tock

W. H. Tock has been appointed assistant to the chief engineer, George E. Stone, on the staff of Basic Incorporated, Cleveland, Ohio. He will have his headquarters in the firm's offices in Cleveland.

Mr. Tock joined Basic to handle the engineering and development of the special high-temperature kilns used by Basic in the manufacture of refractories and lime products.

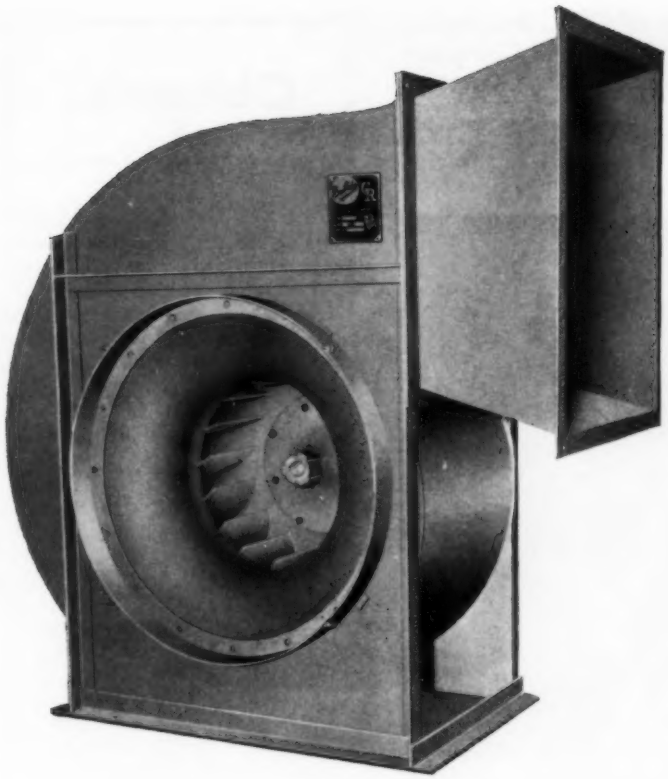
Prior to his appointment at Basic, Mr. Tock specialized in rotary kilns at Allis-Chalmers for 16 years. There he helped develop the kilns at Basic's Maple Grove, Ohio, plant. Among the many unusual and specialized "rotaries" developed by Mr. Tock is the only kiln presently in use for producing taconite. This kiln is in operation at the Oliver Iron Mining Division of U. S. Steel.

Richard A. Grant was recently elected executive vice-president of the California Portland Cement Company, Los Angeles, succeeding L. I. Bancroft, who retired after 38 years of service. Mr. Bancroft will continue to be a vice-president and a director.

Mr. Grant's duties will include those of a director, vice-president, and assistant to E. E. Duque, president of the company.

Col. William D. Milne (ret.) has been elected president of the Kentucky Stone Company, Louisville, Ky. Col. Milne was district engineer at Louisville for the Army Corps of Engineers until he retired last year to become vice-president of Kentucky Stone.

Lloyd L. Brightman has been appointed vice-president and general manager of the Mexico Refractories Company of Texas, successors to the Royall Fired Brick and Supply Company, with offices in Houston and Dallas.



MAXIMUM FAN LIFE for KILN EXHAUST

OFFERED BY "BUFFALO" TYPE "CR" RADIAL BLADE FANS

The newly designed "Buffalo" Type "CR" Fan was engineered and built to give you a long life of useful service with a minimum of maintenance. Designed for punishing industrial operations, its rugged, wear-resistant construction assures you of dependable, trouble-free performance. That's one realistic economy feature.

The radial blade feature of the "Buffalo" Type "CR" Fan combines impressive performance with resistance to abrasion. The mating sections of the inlet wheel flange form a true half-circle, with no flat sections or irregularities. The result is a smooth flow of air, which cuts wear to a minimum . . . delivers peak performance for fans of this type.

The "CR" can save you money in other ways, too. For example, its high-capacity, high-pressure characteristics may enable you to install a smaller, less-expensive fan in many direct-connected applications.

All in all, the "Buffalo" Type "CR" Radial Blade Fan offers you a highly desirable combination of features: favorable first cost . . . high efficiency . . . long life. Contact your nearest "Buffalo" Engineering Representative for full information on the "CR" — or write for Bulletin FD 205.

Engineered into every "Buffalo" Fan is the famous "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ontario

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING COOLING HEATING INDUCED DRAFT EXHAUSTING FORCED DRAFT PRESSURE BLOWING

New York Trap Rock Corporation, New York, N. Y., has appointed LeRoy E. Kienitz assistant superintendent of its Clinton Point (Stoneco) plant.

Before joining New York Trap Rock, Mr. Kienitz served for four years as general quarry foreman of the Alabaster, Mich., plant of U. S. Gypsum, Chicago, Ill. He also was employed as a mining engineer by Pichands, Mather & Company at Crosby, Minn., and spent about two years with the Anaconda Copper Mining Company, Butte, Mont.

Clinton B. Burnett, a vice-president of the Johns-Manville Corporation, New York, N. Y., has been appointed general manager of the Packings and Friction Materials Division, succeeding Francis J. Waken, who has retired after 36 years with the firm.

Carlton J. O'Neil, also a J-M vice-president, replaces Mr. Burnett as general manager of the Celite Division. In his new post, Mr. O'Neil is responsible for the mining, processing, and marketing of diatomite and synthetic silicate products.

Charles H. Wicks has been appointed general superintendent of the Chicago Gravel Company, Chicago, Ill., with headquarters at the firm's Rockdale plant at Joliet. Mr. Wicks succeeds G. E. Singletary, who remains with the company in a consulting capacity.

D. E. Hammond has been named assistant general superintendent, with headquarters at Chicago Gravel's Hammonds plant in Elgin, Ill.

Arthur L. Dent has been appointed assistant general sales manager of the Celotex Corporation. Mr. Dent, who was formerly manager of the company's Atlanta branch, will be located in the Celotex Chicago headquarters. He will be responsible for operations of the Cincinnati, Atlanta, New Orleans, and Texas sales branches.

Harold S. Sparks has been promoted to the position of general superintendent of the El Paso, Tex., plant of the Southwestern Portland Cement Company, Los Angeles, Calif. Mr. Sparks, formerly superintendent, has been with the company for 33 years.

Otto P. Kroeger, chief chemist, was named to succeed Mr. Sparks as superintendent. Mr. Kroeger has been associated with Southwestern Portland Cement Company for 27 years.

Passing of C. K. Boettcher Of Ideal Cement Company Ends Distinguished Career

Claude K. Boettcher, 82, chairman of the board of the Ideal Cement Company, and chairman of the executive committee of Potash

C. K. Boettcher

Company of America, died on June 9 in Denver. Although he had been in ill health for several years, he worked until the day of his death.

Among his many other interests were Cement Investments, Inc., of which he was president; the Boettcher Realty Company; the Boettcher Foundation; and the Brown Palace Hotel. He was particularly interested during the last 20 years in supervising the Boettcher Foundation, through which he contributed heavily to various educational and philanthropic causes. In recognition of these activities he received an honorary degree from the University of Denver in 1950.

Mr. Boettcher entered the cement business founded by his father, Charles Boettcher, early in this century. When the latter relinquished active control of the business, his son became president.

Expanded Clay-Shale Assn. Schedules Mid-Year Meeting

The mid-year meeting of the Expanded Clay and Shale Association will be held August 26 and 27 at the Andrew Johnson Hotel in Knoxville, Tenn. Serving in the capacity of host will be the Shalite Corp.

Among the features of the program will be a comprehensive report of the technical problems committee.

Obituaries

Cecil F. Wilkes, 51, products manager for the Lone Star Cement Corporation at Dallas, Tex., died recently after a brief illness. Mr. Wilkes had been associated with Lone Star since 1949, when he served as a salesman in San Antonio, El Paso, and Wichita Falls.

Before coming to Dallas as head of the products department five years ago, Mr. Wilkes was branch manager in El Paso.

J. Edwin Sweitzer, general sales manager of the Alpha Portland Cement Company, Easton, Pa., died at his home in Phillipsburg, N.J., at the age of 66. Mr. Sweitzer joined Alpha's sales department in 1914. In 1940, he was named assistant to the vice-president and general sales manager, and in 1953, he was appointed general sales manager, the position he held until his retirement in April, 1956.

Paul B. Sutliff, a salesman for the Penn-Dixie Cement Corporation, Des Moines, Iowa, died of a heart attack at the age of 52. Mr. Sutliff, a salesman for Penn-Dixie since 1946, had served the Central Iowa territory.

William L. Strader, 86, a director of the Limestone Products Corporation of America, Newton, N. J., died at a hospital in Sparta, N. J., after a brief illness.

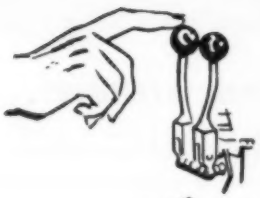
Nels E. Johanson, retired vice-president of the Pioneer Sand & Gravel Company, Tacoma, Wash., died recently in Seattle at the age of 54.

C. J. Wetzel, 72, owner and operator of the Asphalt Products Company, Dayton, Ohio, died in that city after a brief illness.

Robert P. Kuhl, president of the Dundee Sand & Gravel Company, Dundee, Ill., died recently at Waukegan, Ill. Mr. Kuhl was also president of the Kuhl Grading and Excavating Company of Dundee.

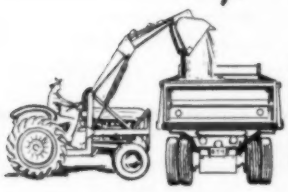
Frank E. Greenough, 61, treasurer of the Assabet Sand & Gravel Company, died recently in Boston, Mass.

Try the steering, compare the price... see how FORD GIVES YOU MORE!



Time the Cycle

Total cycle time of the Ford Loader is less than 11 seconds. Steady operation loads up to 568 yards or 113 truck loads in 8 hours. Tractor hydraulic system is free for use with rear-mounted tools.

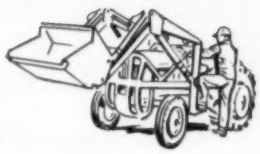


Look at the Lift

10′ 10″ lift to bucket bottom; 8′ 6″ to bucket lip, dumped; 26″ reach dumped at full lift. Generous clearance over average 7′ 6″ truck side. Fill entire truck from one side without "flipping".

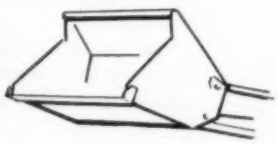
Try the Steering

Compact, close-coupled, maneuvers well in areas other rigs can't even enter! With power steering, a factory option, effortless one-hand steering even on roughest ground leaves other hand free for loader controls.



Measure the Load

993 lbs., average bucket load—a yard in the truck every 3 cycles. Ford's 2500 lbs. breakaway—more than any other 1000 lb. rated loader—gives faster, easier loading of packed or frozen material.

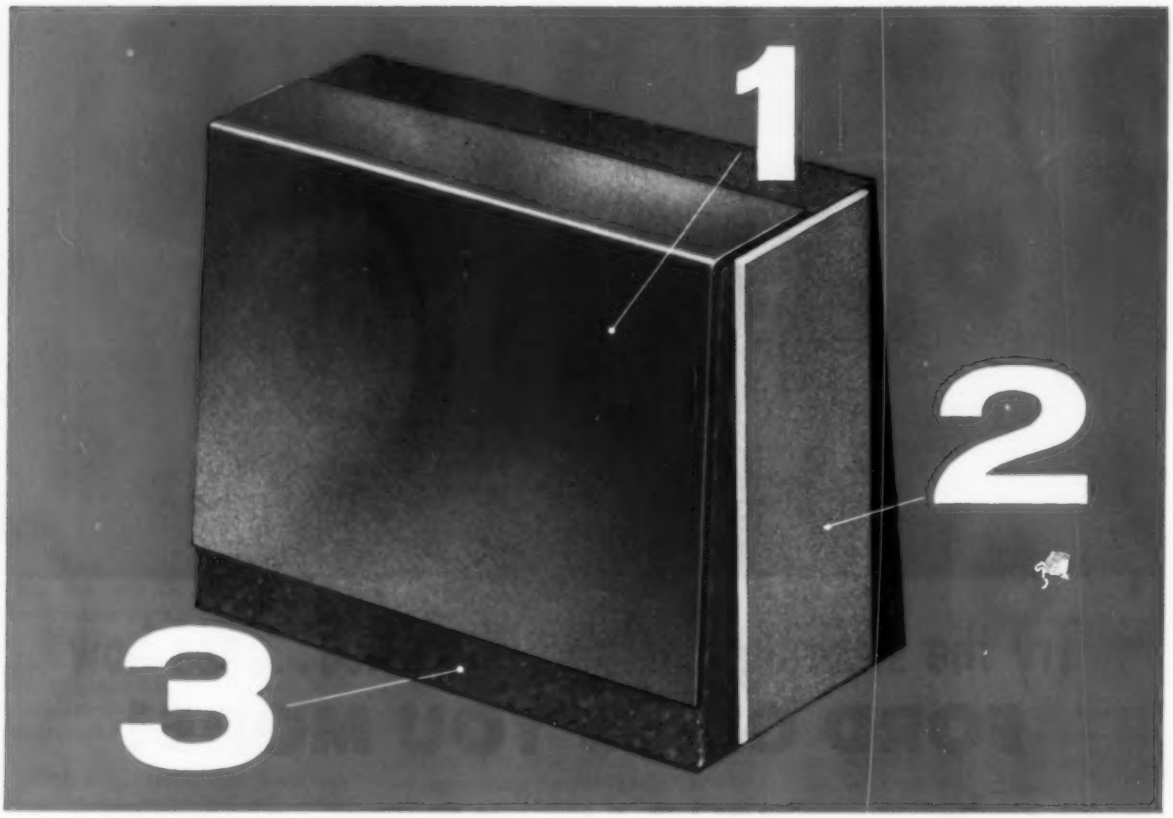


The Ford Tractor-Loader out-performs any rig in its capacity class and many "bigger" tractor-loaders. Before you buy, *compare!* Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

Ford
TRACTORS AND INDUSTRIAL EQUIPMENT

You see more **FORDS** *because they save more money*

KAISER UNITAB*



THESE KAISER-ENGINEERED FEATURES MAKE UNITAB YOUR BEST KILN LINER INVESTMENT . . .

1 Pre-formed steel shim bonded to liner with special adhesive.

- Bonding assures automatic placement of shim between each brick in ring.
- Thickness of combustible adhesive provides correct allowance for circumferential expansion (within ring).
- Radius formed by shim bend provides "V" opening between liners; this "V" serves as a pilot for wedging shims needed to lock ring.
- Shim overlapping hot face makes visual inspection easy—to see that each brick is correctly installed.
- When kiln is fired hot face overlap melts, oxidizes and combines with the feed to speed build-up of coating.
- Half-inch gap between end of shim and shell acts as heat buffer to conserve fuel.

2 Cardboard spacer attached to one end of liner.

- Combustible spacer automatically provides correct allowance for longitudinal expansion (between rings).
- Factory-bonded accessories, both shims and cardboard spacers, simplify handling for installing crew . . . save up to 50% installation time . . . simplify ordering and inventory.

3 Performance-proved Kaiser Periclase-Chrome basic brick.

- The same brick that has been giving cement producers amazing improvements in hot zone service.
- Unequalled for dimensional accuracy and uniformity.
- Outstanding volume stability under loading.
- Excellent resistance to chemical attack by cement clinker at high temperatures.
- High spall resistance—takes and holds coating even through shutdowns.

*Patent applied for—U.S.A., Canada and Mexico.

*(Kaiser Unitab was formerly known as "Unitized Kiln Liner T3")

KILN LINER...

Industry's first **kiln liner with bonded shim and spacer... introduces** *savings up to 50%* **on installation time... makes correct brick placement** *automatic*... **provides foolproof allowances for expansion! Kaiser Unitab liners give you** *all this plus* **superior dimensional uniformity and the unsurpassed hot zone performance of** *Periclase-Chrome* **basic brick...** *pioneered and proved by...*

Call or write Kaiser Chemicals Division, Department C-72x41 Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . . **3 Gateway Center**
HAMMOND, IND. . . . . . **518 Calumet Building**
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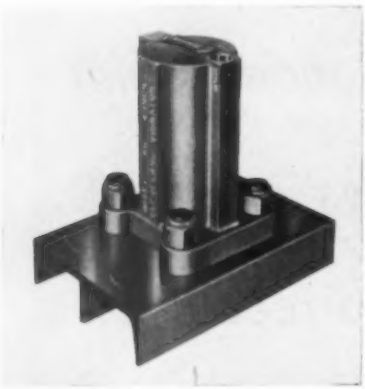
Kaiser Chemicals

Pioneers in Modern Basic Refractories

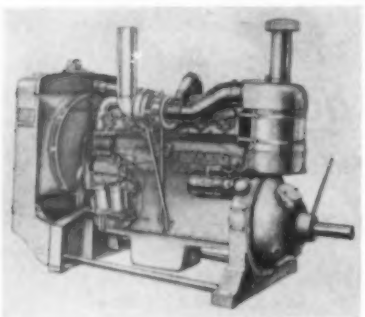
Refractory Brick and Ramming Materials • Castables and Mortars • Magnesite • Periclase • Deadburned Dolomite

New Machinery
and Equipment

For Further Information Use Card on Pages 97-98



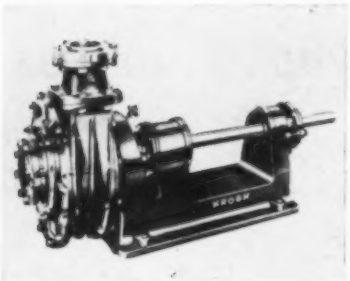
• Type KO, a new air-operated vibrator offered by The Cleveland Vibrator Company, has only two parts, not including the optional base. The steel piston is housed in a cast aluminum or semi-steel cylinder block. The assembly is bolted either directly to the bin, or to a base plate welded on the bin. **(51)**



• International Harvester has entered the turbocharged engine field with its new 250-hp. Turbotorque UDT-1091. The 250 brake horsepower rating is attained at 1,500 r.p.m., an increase of 50 hp. over its naturally-aspirated counterpart, the UD-1091.

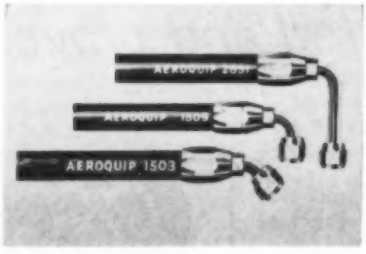
Its exhaust gas driven AiResearch turbocharger moves 60 percent more air through the 14-in. diameter air cleaner. This boost in air supply to the cylinders results in a saving in fuel consumption and higher power with lower exhaust gas temperatures.

A water-cooled oil temperature stabilizer is standard equipment on the new unit. The radiator has been enlarged to increase cooling capacity. An extra-large counter-balanced crankshaft and heavy flywheel are additional features. **(52)**



• The Krogh Model 600 is a heavy-duty, full-lined sand and slurry pump equipped with wear-resistant liners, replaceable and interchangeable with either hard metal or rubber. The pumps are especially designed for pumping sand, slurries, or gritty water on flotation processes, cyclone feed, ore plant feed, refuse or tailings disposal, pit transfer, and dredging, as well as many special abrasive pumping jobs.

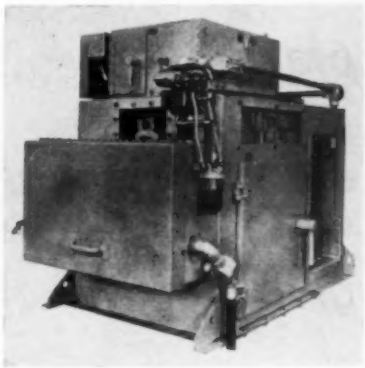
This Model 600 is available in sizes ranging from 2 in. to 8 in., and in capacities from 20 to 2,000 g.p.m. up to 100 ft. head or more. **(53)**



• Hose elbow fittings which simplify hose installation in confined spaces have been developed by the Aeroquip Corporation. Applications include any hydraulic, fuel, air, water, or lubricating oil installation requiring a short radius connection.

Fabricated from formed tubing, the fittings are manufactured in 45 deg. and 90 deg. configurations, and are designed for use with Aeroquip medium and high pressure hose.

The swivel fittings tighten without twisting the assembly. Assemblies with double elbow fittings may be angled to the positioning required by the installation. **(54)**



• A new flush-proof, air-powered hopper door is featured on an automatic scale designed by the Richardson Scale Company for the bulk weighing of materials of millimicron size.

The door seals and locks under pressure. The positive seal is provided by a special rubber ring on the hopper door which fits into a rubber bed on the hopper itself. The rubber is vulcanized directly on the plate and is ground to contour.

Capable of weighing up to 200 lb. per draft, the scale has a normal speed range of up to ten weighings a minute to deliver a virtually continous stream.

Special features of the scale include a locking gear which prevents entry of unweighed material through inlet gate when the hopper door is open, and a six-figure counter for tabulating scale discharges. **(55)**

Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable.

Ag-lime FINES bring more money

Fine grades of ag-lime bring almost twice the market price and are in great demand

(Eagle's portable cage mill at work on property of John W. Karch Stone Company, Celina, Ohio.) The purchase and installation of this plant resulted from a Karch sample being processed into an improved product through an Eagle Cage Mill. Completely satisfied with the results, this machine is now producing approximately 25 tons per hour—easily meeting all state specifications.

You can pick up the steady big premiums on finer ag-lime. Today's scientific farming demands this grade of ag-lime, which, because it is absorbed faster, can recover the investment faster with cash crops.

EAGLE CAGE MILLS produce more fines!

A single pass Eagle four-row cage mill with its high-speed impact, disintegrating action using hard-faced bars, not only produces a finer aggregate—it increases the tonnage as well! The single pass design has been producing this superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw material and weather conditions.

EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc. GALION OHIO·U·S·A

Special offer ... Send us a sample (200# to 300#) of your pit-run ag-stone, *freight collect*, for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!

Rock from the quarry that passes through the RCA Metal Detector, pre-set by you for your situation, is automatically inspected for tramp metal. You know the material is safe—safe for your crushers—once it's "on the other side." It's that easy! Thus, dipper teeth, drill bits, and other hard alloy parts—magnetic or non-magnetic—are brought to light! The conveyor automatically stops or the danger zone is marked, even though the trouble makers are hidden from human eyes.

An official of one large company writes: "Our Metal Detector has saved tens of thousands of dollars!" This equipment can easily pay for itself in reduced repairs, downtime, production gains. An RCA Service Company electronics technician supervises installation by your personnel. A low-cost servicing plan provides continuing maintenance.

Get complete information—Mail coupon

RADIO CORPORATION of AMERICA
Dept. W-236, Building 15-1, N.J.

☐ Please send me complete data on the RCA Metal Detector.

☐ Have representative call to survey our plant.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

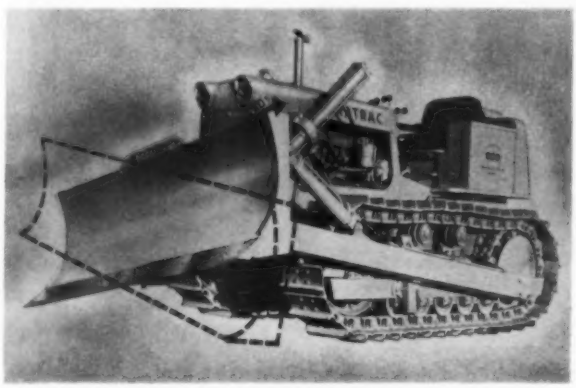
CITY _____ ZONE _____ STATE _____

• A new shaft-mounted speed reducer developed by General Electric offers flexibility of mounting arrangement, increased safety, and lower maintenance cost.

Ratio changes can be made quickly simply by changing pulleys. A wide variety of pulley sizes makes the unit adaptable to a broad range of speeds. The speed reducer is available in most ratings from ¼ to 40 hp. at output speeds for 10 to 420 r.p.m.

Compact and lightweight, the speed reducer has a full 360-degree mounting range around the driven shaft, and is adaptable to a wide variety of shaft diameters. The unit is available in single and double reduction ratings, in ratios of 5- and 15-to-1. **(56)**

• Model 55T, a 55-ton end dump truck manufactured by Dart Trucks, is powered by a 400 hp. diesel engine, a four-speed transmission, and a three-stage converter. It features hydraulic steering, a 35-cu. ft. rock body, and a four-stage, double-acting hoist. The box girder frame is made of four plates welded into box section by submerged arc welding. Gusset supported cross members are welded integral with frame. **(57)**



• Among the new developments introduced by the J. I. Case Company is this "Tilt-Crown" bulldozer blade that can be tilted 14 in. to either side, as well as tipped 10 degrees fore or aft by hydraulic power right from the operator's seat.

The blade is activated by four large hydraulic cylinders. Two cylinders mounted on the dozer push arms control tilt and tip. The other two cylinders, trunion-mounted on the tractor, exert down-pressure with the blade in any position, and also lift the blade 34 in. from ground level. **(58)**

B.F.Goodrich

All-Nylon B.F.Goodrich tires give over 4 years' service to highway excavator

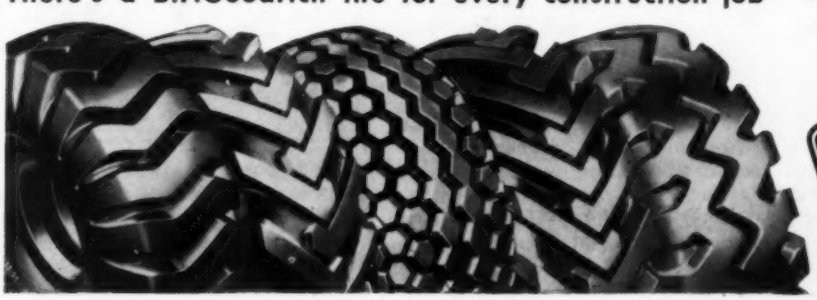
GASPARINI EXCAVATING CO., INC., of Peckville, Pennsylvania, does highway and heavy construction work. Here the company's equipment is at work on the Pennsylvania Turnpike, hauling giant loads over rock-strewn roads. For this rugged work, the company uses B.F.Goodrich FLEX-RITE nylon tires, reports many give over 4 years' service, including 2 retreads.

"B.F.Goodrich *all-nylon* tires have minimized breakdowns, impact breaks and other cost and time-consuming delays," writes President Gene Gasparini. "They help us give maximum contract performance in the shortest contract period."

B.F.Goodrich tires are built with FLEX-RITE nylon cords. FLEX-RITE nylon cords withstand double the impact of other cord materials, resist heat blowouts and flex breaks. Result: more retreadable B.F.Goodrich tires!

Your B.F.Goodrich dealer has a complete line of tires for every off-the-road job, including the new Rock Service Tubeless or tube-type (far left) for mining, quarrying and dirt-moving jobs. And he offers expert, on-the-job tire service. See him today or write *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

There's a B.F.Goodrich tire for every construction job



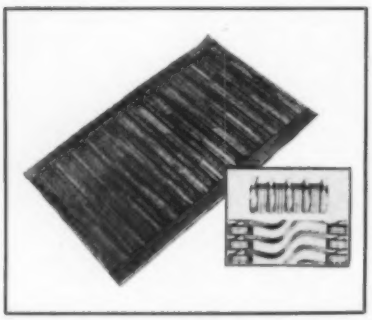
Specify B.F.Goodrich tires when ordering new equipment

B.F.Goodrich
FIRST IN RUBBER

Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

• Model 440, a new hydraulic hoist, suitable for conversion installation on ¾- and 1-ton trucks, has been developed by the Hercules Steel Products Company. The Model 440 is designed for use under Hercules light-duty dump bodies up to 8 ft. in length, platform bodies up to 10 ft. long, or 6½ to 9½ ft. pick-up bodies.

The new hoist has a dumping angle of 45 deg., and an 8-9/16 in. mounting height. Oil reservoir, manifold, remote control valve, and PTO-driven pump are unit-mounted on the hoist subframe. Hoist operation is completely controlled from the truck cab. Slide-type control valve and high output dual shaft pump are said to assure precise hoist control and rapid lifting. **(59)**



• Wedge-Wire Corporation introduces its new "S" Kleenslot preparation screen for de-watering, screening, washing, extracting, filtering, or sizing applications. The screen is engineered for applications in which the screening out of flats or slivers is of prime consideration. This is accomplished by an "S" bend in the wire which reduces the normally long slot. **(60)**

• Mobile Aerial Towers, Inc., has introduced three series of Hi-Rangers for mining and quarrying operations. Hi-Rangers series 5, 7, and 10 have maximum reaches of 24 to 100 ft., and enable workers to elevate or lower themselves to work points by actuation of a single "three-dimensional" control mounted on the personnel basket.

The "3-D" control raises, lowers, turns, backs, or advances the location of the basket to any point in a hemisphere limited by the maximum length of the Hi-Ranger booms. Lifting capacities range from approximately 500 lb. to 2,000 lb.

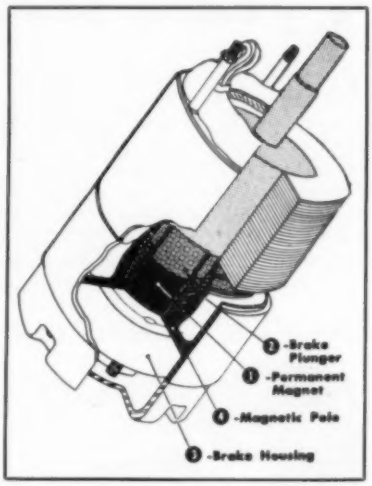
The new series is mountable to almost any industrial vehicle capable of bearing the required work load. Special hydraulic outriggers are incorporated for improved stability. **(62)**

• A 600-hp. diesel rear dumper for off-the-highway use has been developed by the Autocar Division, The White Motor Company. Designated the AP-40, the new dumper is engineered for 40-ton payloads and travels at speeds up to 33 m.p.h. Gross weight, with 40-ton payload, is 85 tons.

Equipped with a 27-cu. yd. body, the AP-40 is powered by a V-type, turbo-charged 12-cylinder Cummins diesel. All welded box-construction frame of one inch carbon steel is designed to resist the torques encountered under severe off-the-highway conditions.

An offset-mounted cab, designed for driver safety and comfort, features an adjustable steering column. Set-back, side-track front axle provides maximum maneuverability.

The AP-40 drives on all four wheels in the tandem rear. If either set of wheels loses traction, an air-powered lock applied on an inter-axle differential by the driver from the cab blocks out torque loss, permitting the other axle to continue driving. **(61)**

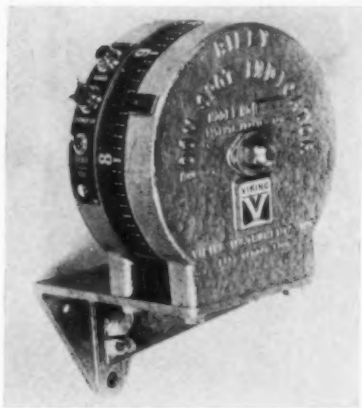


• A new Cle-Matic brake motor has been announced by The Cleveland Electric Motor Company. The new unit is a polyphase motor with the built-in mechanical brake, and is de-

signed for quick releasing and fast braking.

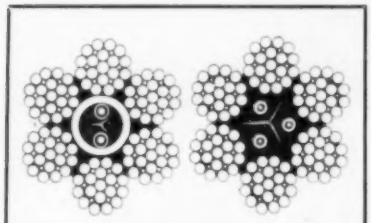
The new Cle-Matic "F" motor eliminates solenoids and coils. The magnetic field of the stator releases the brake when starting, and the permanent magnet applies the braking force when the current is turned off.

Motors are available in polyphase designs, 1,800, 1,200, and 900 r.p.m. **(63)**



• Viking Instruments, Inc., has designed a boom spot indicator which serves in the dual capacity of a safety control and a boom spot aid. The indicator is adaptable to all types of boom rig cranes from 35 ft. to 170 ft.

Mounted in the cab house, the indicator is easily read by the operator. It is controlled by a cable attached to the boom which gives the operator a numerical reading of the boom angle at all times. An integral signal light unit provides a red flasher warning when the boom is about to enter the danger zone. **(64)**



SignalKore cross-section with two-conductor core.

SignalKore cross-section with three-conductor core.

• Designated SignalKore, this new, sturdy, high-strength wire rope, designed by the Wire Rope Div., American Chain and Cable Company, Inc., can be used for transmitting continuous communication instructions through its center core as well as transmitting force for hoisting and other materials handling operations.

SignalKore was made possible by the development of a practical method in which copper wire conductors are imbedded in a fiber core, which is then "laid-up" in a rugged steel wire rope. Thus hoist ropes and other operating cables can be used to transmit low voltage current for continuous voice or signal communication through the wire rope itself.

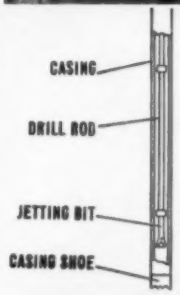
SignalKore is available in 11 rope diameters in sizes of ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½, 1⅝, 1¾, 1⅞ and 2 in. Breaking strengths for the smallest diameter is 47,600 lb. for the Bright and Galaeco finish and 42,840 lb. for the galvanized finish and ranges to 320,000 lb. and 288,000 lb. respectively for the 2-in. diameter rope.

Cores for the ¾, ⅞, and 1-in. diameter ropes are supplied with two conductors. Ropes 1⅛ in. in diameter and larger have three conductors. Each conductor has an electrical resistance of approximately 26 ohms per 1,000 ft. **(65)**

What's down there?

Empire
TEST DRILLS
come up with the
RIGHT ANSWERS

EMPIRE
Hydraulic
Testing
Drill

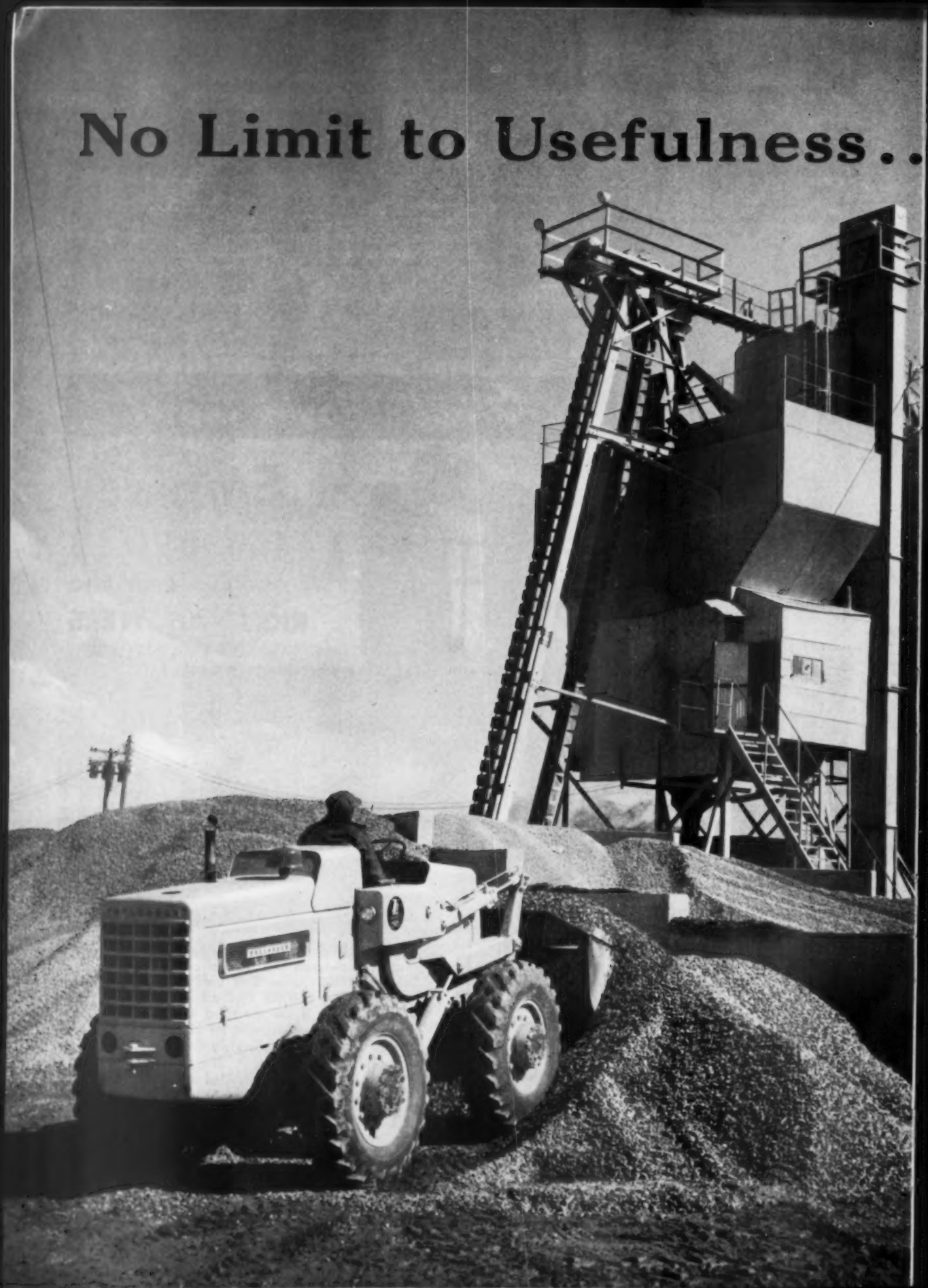


This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

Write TODAY for complete details

NEW YORK ENGINEERING CO. 75 WEST STREET NEW YORK 6, N. Y.

No Limit to Usefulness . . .



. . at El Paso Sand Products Co.

THESE OWNERS ARE WELL PLEASED with the great versatility and performance they are getting from the Model HU "PAYLOADER" tractor-shovel at this sand and gravel and ready-mix concrete operation. Replacing another make of rubber-tired loader, the HU "easily performs tasks the other machine found impossible." Gerald Campbell, general plant superintendent, remarked that the 4-wheel-drive feature of this "PAYLOADER" is the big advantage . . . it can climb loose stone stockpiles with a full load, it has the power to dig sand from pit sides for fill material and the speed to stockpile or load-out trucks with special sand or stone orders all over the plant area. Ample engine power and excellent operator vision are added factors in the HU's fine performance.

YOU, TOO, WILL FIND that among rubber-tired tractor-shovels, none can match the versatility, mobility and productive capacity of the new 4-wheel-drive "PAYLOADER" units. More reliable traction, greater digging power and faster, easier operation are some of the "PAYLOADER" advantages that appeal to operators who know tractor-shovels best. You get better performance from a "PAYLOADER" because of these outstanding features: power-transfer differentials, no-stop power shift transmission, planetary final drives, power steering, power brakes and closed, pressure-controlled hydraulic system. A nearby Distributor is ready to prove that a "PAYLOADER" can out-perform anything in its class — to have you try one on your work. Call him today.

The knowledge and experience gained in building thousands of wheeled tractor-shovels — more than all others combined — over the past 35 years is your assurance that when you buy a "PAYLOADER" you get a unit that is superior in design, engineering and performance.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send more data on 4-wheel-drive "PAYLOADER" tractor-shovels as checked:

- ☐ HO - 9,000 lb. Carry Cap. (1 to 4 cu. yd. buckets)
- ☐ HH - 7,000 lb. Carry Cap. (⅞ to 3¼ cu. yd. buckets)
- ☐ HU - 5,000 lb. Carry Cap. (⅝ to 2½ cu. yd. buckets)

NAME_____

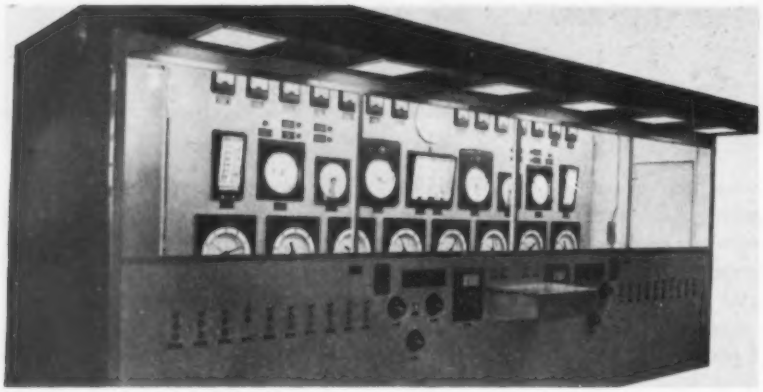
TITLE_____

COMPANY_____

STREET_____

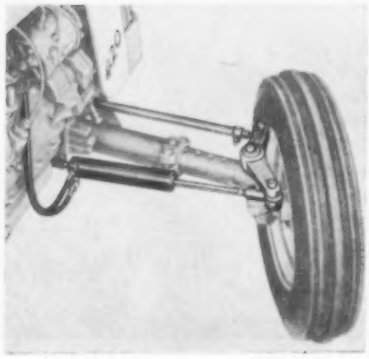
CITY_____ STATE_____

112



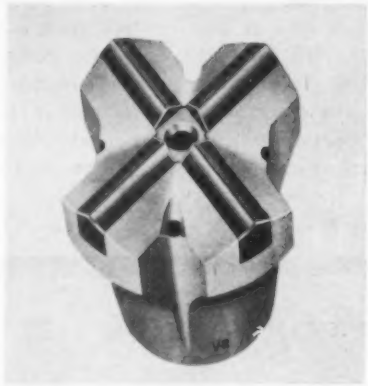
• Allis-Chalmers has developed a completely enclosed master kiln control. The control has a shatter-proof enclosure with a glass front. All recording and indicating instruments are mounted inside a pressurized, sealed cabinet to prevent dust infiltration. All manual controls are located outside the cabinet in an accessible position which gives the operator a full view of the instruments within.

Each of the duplicate groups of controls comprising the 18-ft. panel (illustrated above) takes care of an 11 ft. 3 in. by 160 ft. dry process rotary kiln and a 10 ft. by 100 ft. rotary cooler processing lightweight aggregates. **(66)**



• Power steering is the latest advancement in the John Deere line of industrial tractors and equipment. The new power steering assembly is available for installation on the "420" Utility and "420" Special Utility industrial tractors.

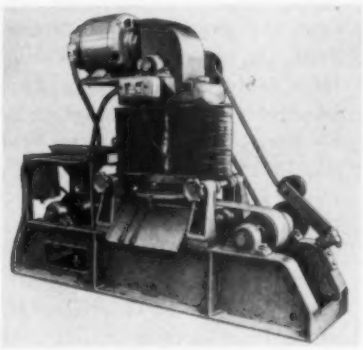
The assembly includes a hydraulic cylinder located between the tractor front-end support and a special heavy-duty steering arm. The system is actuated by applying approximately 3 lb. of pressure to the steering wheel. **(67)**



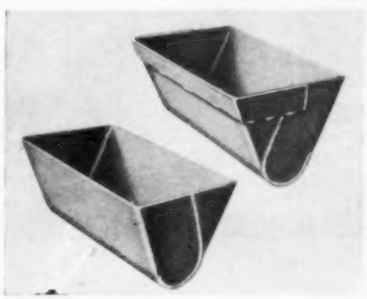
• Vascoloy-Ramet has introduced a new series of rock bits with tungsten carbide inserts made to fit directly on Type 600 and 1000 series steels. Designed with the inserts mounted in an "X" formation, these new bits are said to eliminate rifling and provide uniformly round holes in hard ground. V-R "X" style bits feature 5-hole construction and wide chip channel design for faster removal of larger chips. Style 600 "X" bits are available in 3 in., 3¼ in., 3½ in., 3¾ in., 4 in., and 4½ in. diameters. **(68)**

• Emco Pneumatic Corporation has available a new fully automatic ½ in. air filter. The Emco Jet is designed to prevent moisture, sludge, and other foreign substances heavier than air from entering pneumatic equipment operating on intermittent air flow.

Designated the Emco L-200A-½ in., the new air filter operates on a maximum of 90 c.f.m. Maximum working pressure is 300 lb. **(69)**



• Stearns Magnetic Products has announced its new magnetic separator for selective mineral analysis, the Stearns Ring-Type "D" Separator. The separator operates by passing the material through the high-intensity magnetic field produced by the rotating magnetic ring. The mechanism employs a "free lift" principle of separation—the magnetics contained in the feed material are lifted from the mixture as it passes beneath the take-off ring. This minimizes the incidental mechanical entrapment of the associated minerals in the product being removed and contributes to maximum selectivity. **(70)**

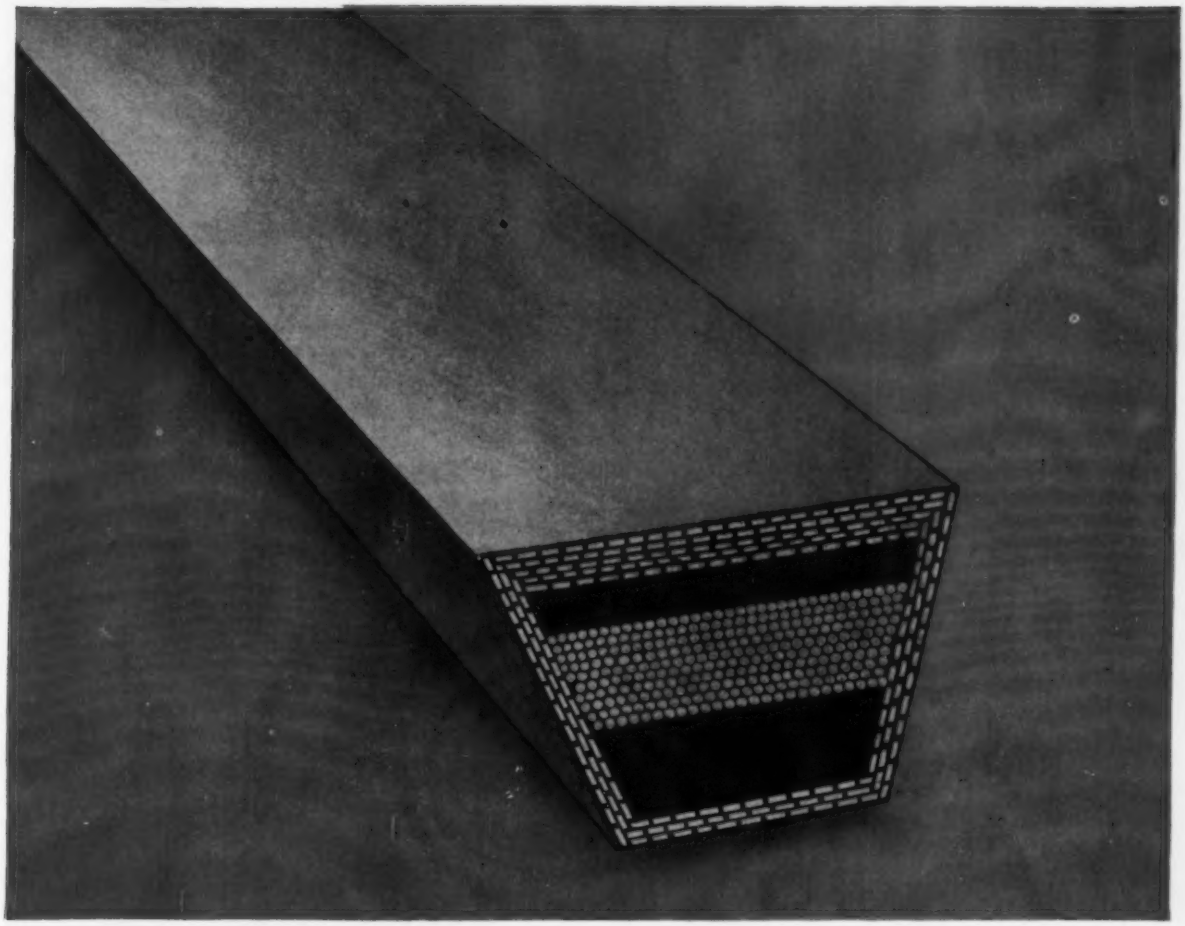


• Wincar Welders is manufacturing a new, welded-steel elevator bucket known as the "J" bucket because of the letter "J" formed by the weld on each end.

Fabricated from a single, shaped steel plate, the buckets are lightweight, yet strong and durable. The light weight of the bucket makes possible higher speeds and a wider variety of fastening methods.

"J" buckets are available in standard A, AA, and AA-RB sizes. **(71)**

US RUBBER V-BELTS



QUALITY—
your Biggest V-Belt Saving

Exclusive Equa-Tensil cord construction; new curing methods; the facilities of the largest and most modern plant devoted exclusively to the production of endless transmission belts—these are some of the factors that bring to the construction and quarrying industries the one V-Belt whose quality assures you of getting the most V-Belt for your money.

This quality is built into every U.S. V-Belt. It contributes greatly to the long life and efficient operation of off-the-road equipment, compressors, generators, crushers, conveyors—any place where power transmission belts take heavy shock loads.

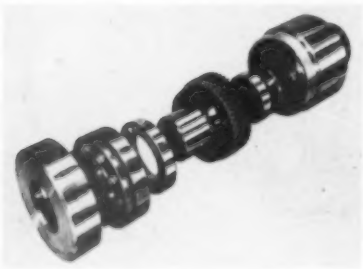
A complete line of V-Belts, plus expert engineering assistance, is available at any of the 28 "U.S." District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

US RUBBER

Mechanical Goods Division

United States Rubber

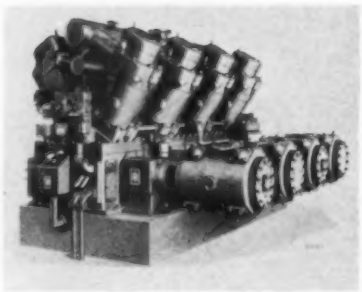
• Gar Wood's ¾ cu. yd. Model 75B excavator offers independent travel, hoist or swing, positive independent chain crowd, and direct gear drive. (72)



• A new type clutch for use on a 12BU loader has been introduced by Penn Machine Company. According to the manufacturer, field tests indicate that the new clutch results in substantial reduction of part failures in gathering arms, gear pots, head motors, and head motor speed reducers, thus reducing downtime.

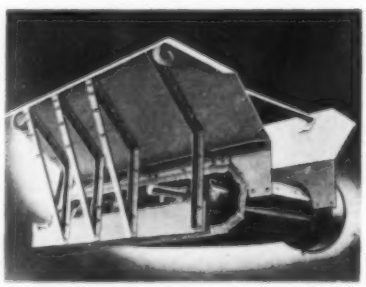
The key element is a series of fiber-coated steel discs which can be set to withstand a predetermined pull in amperage (usually 35 amps.) without slipping. If the machine is overloaded, causing a pull in amperage greater than that for which the discs are set, the discs begin to slip and the gathering arms slow down, thus warning the operator of the overload. Ball bearings are used to reduce friction, and all moving parts operate in a bath of oil which also serves as a cooling agent within the oil tight case.

When amperage drops off due to continued usage, the clutch can be reset for the required pull by a simple adjustment of the cap. (73)



• The SVO diesel engine compressor, available from the Ingersoll-Rand Company, is a heavy-duty machine which combines a 4-cycle, V-angle, diesel engine and a double-acting compressor into a single, compact unit. At sea level, the SVO will compress 6,040 cu. ft. of air to 100 p.s.i. for every gallon of fuel.

Available in five sizes, the SVO can be furnished with 12-in. stroke compressor cylinders to handle air or gas at any pressure or vacuum. Complete regulation of pressure and capacity can be given by manual or automatic control. (74)

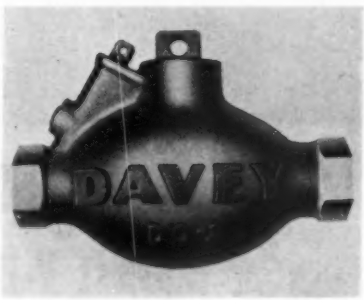


• Pioneer Engineering has introduced its newly-redesigned line of apron feeders, which includes more than 50 types and sizes of portable apron feeders.

Unit feeders are available with standard pan widths of 30 in., 36 in., 42 in., and 48 in., and in standard lengths of 4 ft., 6 ft., 8 ft., and 12 ft. The long portable apron feeder is available in either the 36-in. by 30-ft. or 42-in. by 30 ft. sizes. (75)

• Gardner-Denver Company has added two new models—the RP125 and the RP365—to its line of rotary compressors.

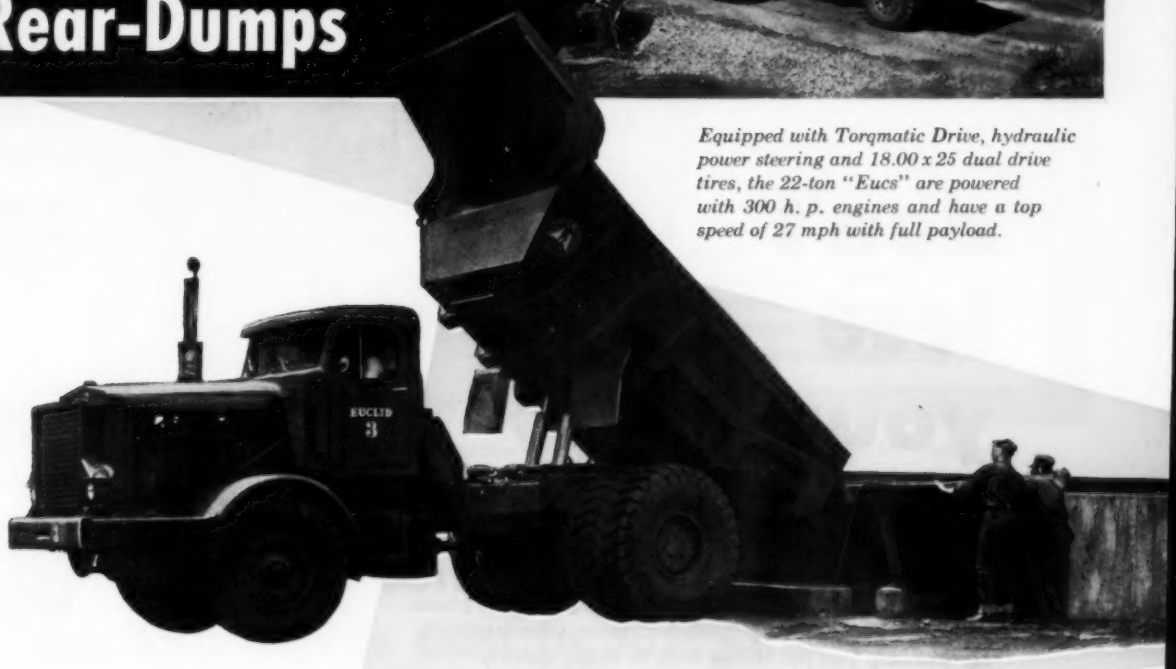
According to Gardner-Denver engineers, the engine starts freely, and warm engine water circulates through the compressor oil cooler and reservoir; thus, warm, free-flowing oil is supplied to the compressor as soon as it starts running. (76)



• A new series of line oilers for air tools and rock drills has been introduced by the Davey Compressor Company.

The oilers, made of cast aluminum, operate on the "drop-in-pressure" principle. When air tool throttle is closed, air hose and oiler oil chamber build up to maximum line pressure. When throttle is opened, line pressure in the hose drops slightly. Reducing pressure in the oil chamber carries oil through the suction tube into the air hose, assuring an ample supply of oil at the start of tool operation, after which an even flow is transmitted as the result of normal air pulsations. (77)

87% Availability with "Euc" Rear-Dumps



Equipped with Torqmatic Drive, hydraulic power steering and 18.00 x 25 dual drive tires, the 22-ton "Eucs" are powered with 300 h. p. engines and have a top speed of 27 mph with full payload.

Five Euclids haul 2500 tons of rock daily for Dragon Cement Co.

Steady production is maintained at Dragon Cement Company in Northampton, Pennsylvania with a haulage fleet of six 22-ton Rear-Dump Euclids. Simple, rugged construction and a thorough preventive maintenance program have enabled these reliable haulers to post an 87% availability record. Depending on production requirements, four or five of the "Eucs" work an average of 6 hours per day each, with either one or two held for standby service.

Assistant Plant Manager F. J. Anderson reports that the Euclids are loaded by two 2½ yd. shovels and haul an average of 2500 tons of cement rock daily to the dumping spot over a mile away. Loads are dumped into the 35-ton hopper in 30-45 seconds. Total time for the 2¼ mile trip from loading shovel to hopper and return averages 11 minutes.

The dependable performance of "Eucs"—job-proved on hundreds of mine, quarry and industrial operations—results in more work done at lower cost per ton. Your nearby Euclid dealer will be glad to provide you with facts and figures on the complete line of Euclid earthmoving equipment . . . and show you why ***Euclids are your best investment.***

•

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

don't lose your head!

When bearings fail, don't go to pieces... get on the phone and tell an authorized SKF distributor your troubles. He will help you put things back in order, quickly. Every authorized SKF distributor carries a complete line of SKF ball and roller bearings and pillow blocks — a type for every use — and he is factory-trained by SKF to assist you on any knotty production problems.

Call him for prompt, reliable service on all bearing requirements.

7788

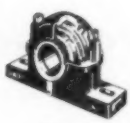
SERIES SES RUBBER-FLEX

SERIES SY

SERIES FY FLANGED MOUNTING

SERIES SUS

SERIES FUS FLANGED MOUNTING



SERIES SAF

SELF-ALIGNING BALL BEARING

SINGLE ROW DEEP GROOVE

ANGULAR CONTACT BALL BEARING

DOUBLE ROW DEEP GROOVE

SPHERICAL ROLLER BEARING

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TAPERED ROLLER BEARING ("Tyson")

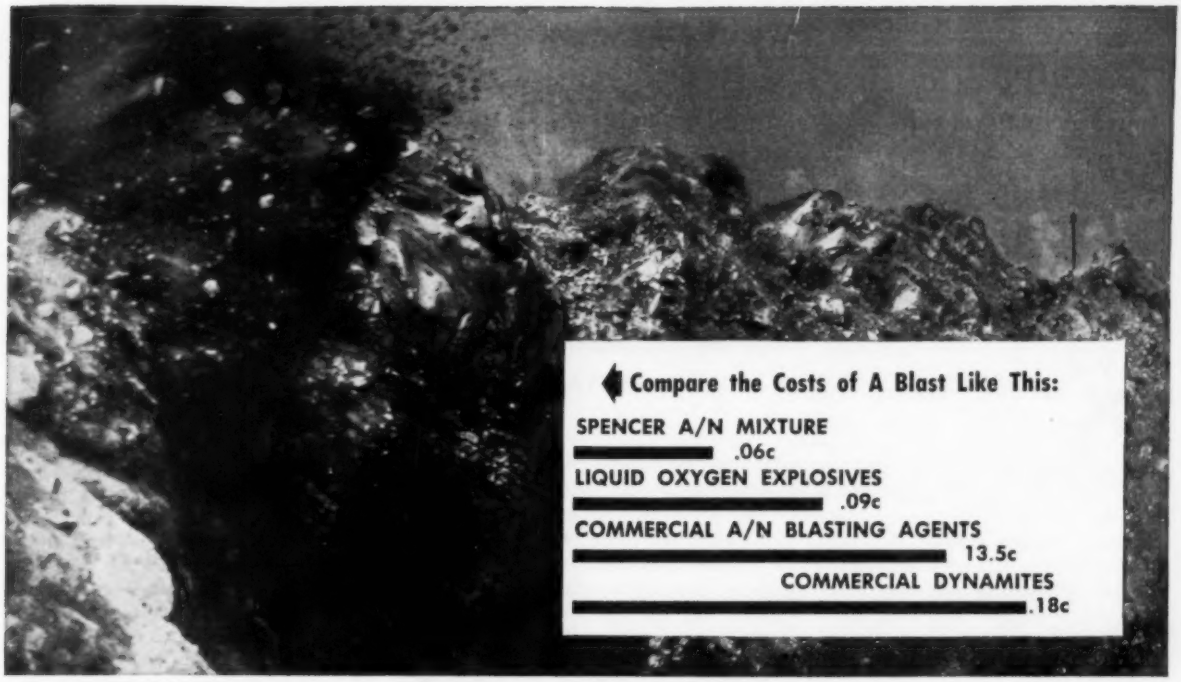
SERIES SDAF

SKF®

BEARING REPLACEMENT SERVICE

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*Reg. U.S. Pat. Off. Tyson Bearing Corporation



SAVINGS UP TO 50% are common when Spencer Prilled Ammonium Nitrate is used for blasting.

How a Kansas Company Saved $45,000 On Explosives Cost In Just One Year:

Read how Spencer Prilled Ammonium Nitrate cuts blasting costs, and gives better fragmentation — yet stores and travels safely!

You can cut your blasting costs with Spencer Prilled Ammonium Nitrate. A Kansas user, the Pittsburg and Midway Coal Company, cut $45,000 from its explosives bill in just one year! A rock producer reports net savings of $25,000 on a job involving about a million cubic yards of rock.

Spencer prills blast better because their spherical structure offers an increased surface area. This extra area produces more explosive speed and energy—about ¼ more, according to recent scientific investigations.

You get better fragmentation, too, with Spencer Prilled Ammonium Nitrate. This means you can move as much as 25% more material.

Mixing is never a problem with free-flowing Spencer Prilled Ammonium Nitrate. Shipped in polyethylene-lined bags, Spencer prills resist caking and help assure a tightly-packed mixture. In even the simplest mixing operations, round Spencer prills get a better coating of carbonaceous material. And that means a better blast.

Safe and easy to handle, Spencer Prilled Ammonium Nitrate is not cap sensitive, either by itself, or in carbonaceous mixture. In laboratory tests, rifle bullets were fired repeatedly into these mixtures without detonation. With dynamite, the same test produced violent explosions every time.

Also, it costs less to ship Spencer Prilled Ammonium Nitrate. That's because prills are so safe they can be shipped at ordinary freight rates rather than at the rate fixed for explosives.

If you, too, want to cut costs and increase your blasting efficiency, let us help you develop a low-cost blasting program with Spencer Prilled Ammonium Nitrate. Write or phone Spencer Chemical Company, Dwight Building, Kansas City 5, Missouri, BAltimore 1-6600.

SPENCER CHEMICAL COMPANY

610 Dwight Building • Kansas City 5, Mo. • BAltimore 1-6600

Labor Developments

The Gravel Pit and the Supreme Court

THE pit-and-quarry industries, which have been responsible for more than their proportional share of legal decisions involving labor relations matters, have just added one more to their record. This time, the Supreme Court, speaking through Justice Frankfurter, has decided an important matter of principle involving a gravel pit in Oconomowoc, Wis., which employs from 15 to 20 men.

The facts are very simple and not unfamiliar to many employers in these industries. The Teamsters' Union sought, unsuccessfully, to induce some of the employees to join. They commenced to picket the entrance to the gravel pit with signs reading, "The men on this job are not 100 percent affiliated with the AFL." As a result, drivers of several trucking companies refused to deliver and haul goods to and from the pit, causing substantial damage to the owner, who sought an injunction from the Wisconsin Court to prevent the picketing.

The gravel pit owner asked the Wisconsin Court to issue the injunction on the finding that the picketing was for the purpose of forcing him to coerce his employees to join the union; and that it had injured his business because he refused to interfere with his employees' rights to join or not to join a labor organization as they wished. The court issued an injunction, but not on this requested ground. Instead, it found that the union had violated a Wisconsin law which prohibited picketing in the absence of a "labor dispute." It found that there was no labor dispute, and therefore enjoined the union from displaying signs which indicated that there was a labor dispute, thereby inducing others to decline to transport goods to and from the business establishment. It was this case which finally was appealed to the Supreme Court. The Supreme Court heard it, primarily because a similar case had arisen in Maine, and the court felt that it was now necessary to provide a definitive ruling on the matter.

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

Justice Frankfurter, in his opinion, took occasion to review the history of U.S. Supreme Court precedents on this question of legal and illegal picketing. It is clear from this review, as well as from the dissenting opinion of Justices Warren, Douglas, and Black, that in the last 17 years there has been a complete reversal on this question.

In 1940, in the now famous case of *Thornhill vs. Alabama*, the Supreme Court made the most sweeping pronouncement about the right to picket. In general, the doctrine enunciated was that all forms of peaceful picketing were nothing more than exercises of the right to freedom of speech and as such were protected by the Fourteenth Amendment. Under this doctrine, picket signs were essentially forms of communication whereby the union was telling its story to the public. Even if that story was false, the court was disinclined to do anything about it. Furthermore, even if the purpose of the picket line was far more serious than merely communicating information, so long as the picketing was peaceful, there appeared to be little that could be done about it.

As might have been expected, over the years, the practicalities of the situation required limitation now and then on this sweeping doctrine. Thus, where violence was involved, the doctrine was not held to apply, and injunctions were issued. In later cases, there was increasing recognition that picketing by an organized group is more than free speech since it involves patrolling a particular locality and since the very presence of a picket line may induce action of one kind or another, irrespective of the nature of the ideas which are being disseminated.

There followed a series of decisions sustaining injunctions against peaceful picketing, even when it arose in the course of a labor dispute, when such picketing was counter to a valid state policy in an area where state regulation was appropriate. From this position, it was only a short step to enjoining picketing in a state whose statutory policy was opposed to employer coercion of employees' choice of bargaining representatives. The final step was taken in the Maine case and in the Wisconsin case in which the picketing was enjoined because it violated state laws.

It was, however, clearly pointed out by the Supreme Court that the one thing a state could not do was to enact a blanket prohibition against picketing of any kind. What was upheld here was the prohibition of picketing of a particular kind, which violated a state law on a subject over which the state has full power to legislate. The rule, then, seems to be: "Picketing for an unlawful purpose can be enjoined although it is entirely peaceful, while picketing for a lawful purpose may not be enjoined until its anti-social character becomes clearly obvious."

This whole subject of the evolution of the court's attitude toward picketing tells a story which may be worth considering in relation to the court's attitude toward future labor relations matters. More than 17 years ago, when labor unions were relatively weak, the courts, including the Supreme Court, were sometimes willing to grant them sweeping privileges. Now that union strength has risen substantially, the courts are more inclined to assess their power realistically and to permit limitations upon it.

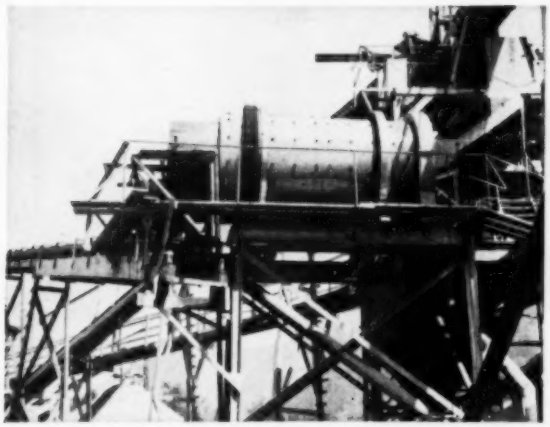
Agreement to Arbitrate Enforceable

In another of the many decisions issued on labor matters by the Supreme Court in its present session, there is a precedent-making decision which permits the federal courts to enforce arbitration clauses found in labor agreements.

(*Continued on page* 92)

at ASSOCIATED SAND & GRAVEL CO. PLANT, Baker Dam, Washington

Scrubbing was a problem—



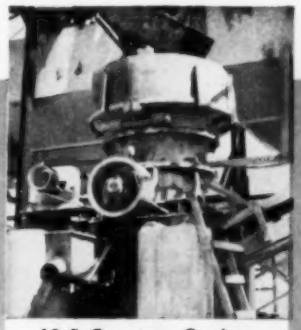
TELSMITH
84″ Super-Scrubber
solved it!

About 1,200,000 tons of concrete aggregates, in 5 sizes, for Baker Dam—and the Associated Sand & Gravel Co. plant at Concrete, Washington, working on extremely coarse pit material abounding in clay. What a scrubbing problem! But its Telsmith 84″ Super-Scrubber easily handles a plus ¼″ minus 6″ feed of gravel with a heavy sandy-clay coating—turning out as high as 150 cu. yds. per hour—with the product so clean it looks hand-scrubbed. And, these gravel particles are *not* round, but angular, with crevices. Still all the clay is removed by the Telsmith Super-Scrubber! (Bulletin 292 tells how). Plant production is 285-325 cu. yds. hourly of concrete sand, plus ¼″ minus ¾″, plus ¾″ minus 1½″, plus 1½″ minus 3″, and 3″ minus 6″ gravel. (Send for Bulletin 266.)

OTHER TELSMITH EQUIPMENT IN THIS PLANT

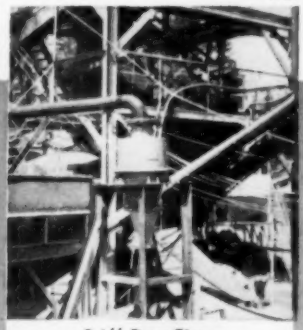
G-27

25″ x 36″ Jaw Crusher. Get Bulletin 280.



13-B Gyratory Crusher. Get Bulletin 281.

18″ x 11′ Twin Screw Rewasher. Get Bulletin 292.



24″ DorrClone. Get Bulletin 285.

SMITH ENGINEERING WORKS

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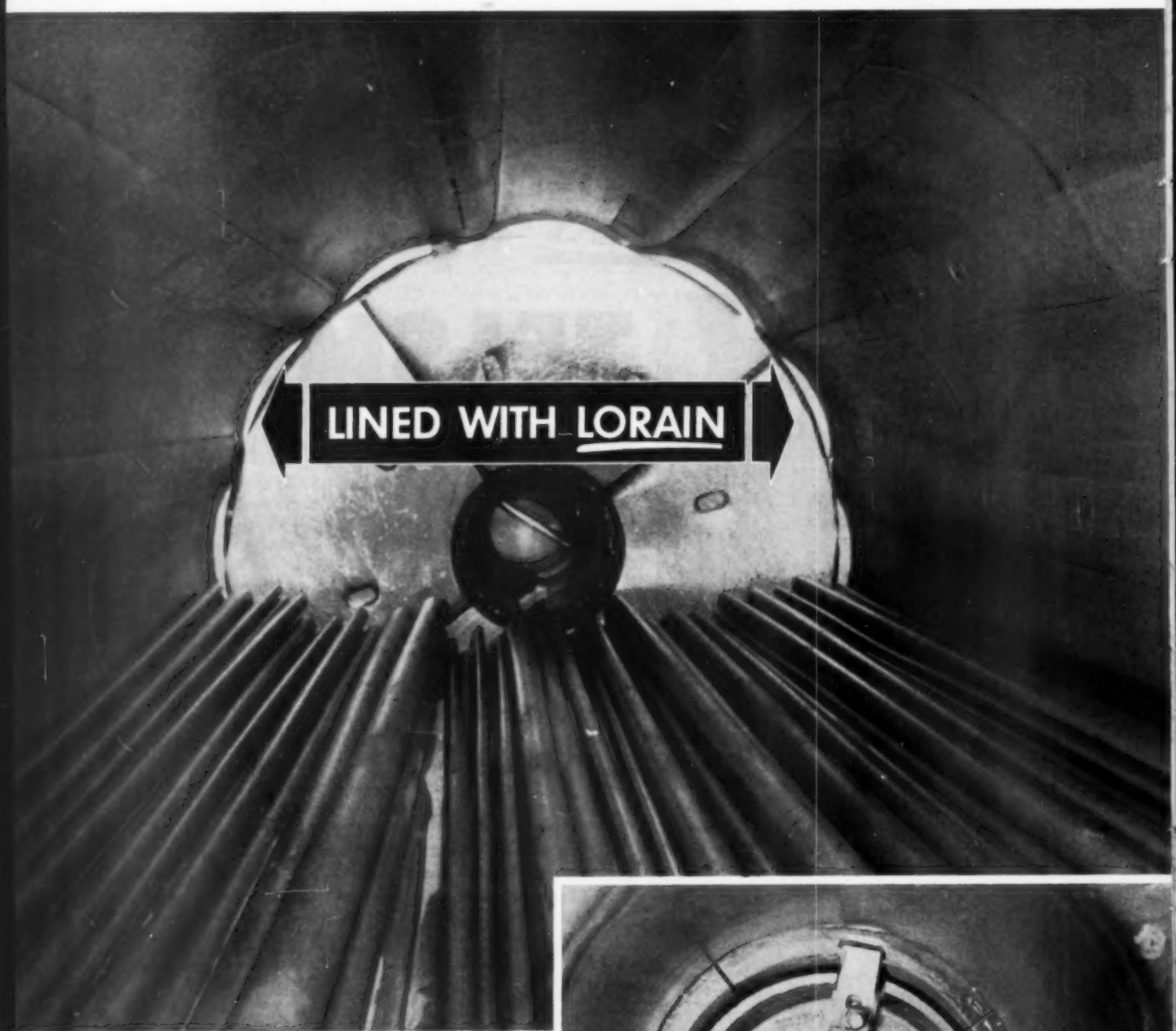
Foote Mineral grinds



LINED WITH LORAIN. This Marcy rod mill had ground 65,000 tons of spodumene ore when picture was taken. Notice snug fit of the Lorain Rolled Steel Plate Linings. Lift has been retained.

THIS 5' x 12' MARCY ROD MILL wet-grinds spodumene, an ore so hard that a particle of it will **scratch glass!** The size of the ore input is ¾" x 35 mesh. Output is 20 mesh, or no particle larger than .018-inch diameter. The mill is lined with USS Lorain Rolled Steel Plate Linings.

hard spodumene ore...

with USS Lorain Rolled Plate Linings

Spodumene makes for tough grinding. In fact, a small particle of it is sharp enough to scratch glass—a feat usually reserved for diamonds. Spodumene-bearing pegmatite is a source of lithium, an element used in the manufacture of glass, ceramics, and greases. This hard ore can—and has—played hob with grinding-mill linings.

When Foote Mineral Company, King's Mt., N. C., put two 5′ x 12′ Marcy rod mills to work wet-grinding spodumene in 1953, USS Lorain Rolled Steel Plate Linings were used in one of the two mills. After ten months, the Lorain Linings had ground a record tonnage of spodumene and lasted 33% longer than the linings in the other rod mill.

An engineer at Foote Mineral Co. said: "Lorain liner costs have averaged substantially less per ton of ore ground than our former liners. We are particularly pleased with Lorain Liners in that, after installation, we experienced no liner shifting or bolt breakage."

USS Lorain Plate Linings give this kind of performance because the steel is rolled to specifications that result in toughness, which allows the liner plates to wear paper-thin without failure.The lift bars are rolled from alloy steel for *extra* hardness that maintains lift and grinding efficiency for the life of the lining. Because Lorain Linings are tougher, thinner linings can be used—thus increasing mill capacities.

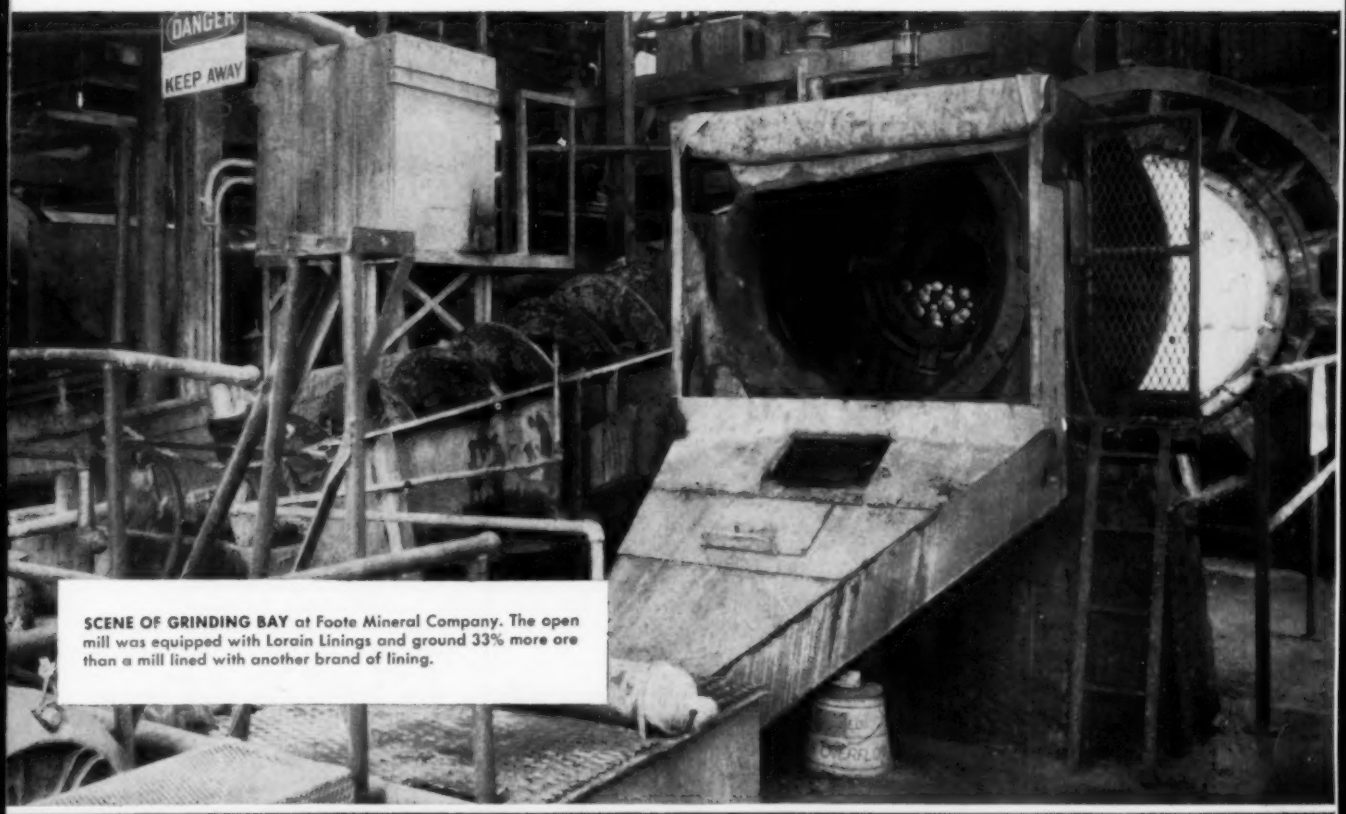
For close tolerances and snug fit, for long-lasting linings that mean lower-cost grinding, always specify USS Lorain Rolled Plate Linings. A note to Specialty Products Sales, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., will bring experienced engineering assistance on any grinding problem.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

USS

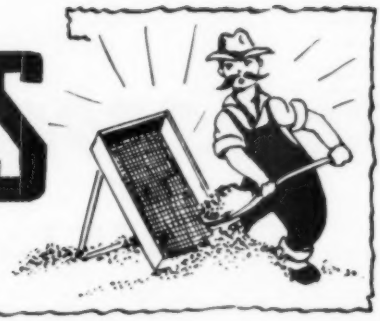
6-1085



SCENE OF GRINDING BAY at Foote Mineral Company. The open mill was equipped with Lorain Linings and ground 33% more ore than a mill lined with another brand of lining.

UNITED STATES STEEL

SCREENINGS



By RAY L. SMITH JR.

HOUDINI, the magician and escape artist, could get out of any jail, handcuffs, or strait-jacket that he ever tried—that is, all save one.

That one place was a little jail in the British Isles. Houdini worked at the cell lock for more than two hours. He worked with that terrific speed that usually unlocked doors in thirty seconds. But he couldn't get the lock to spring. Finally, tired out by his strenuous efforts, he fell against the door. It swung open—it had never been locked!

Life is something like that, isn't it? We build up in our minds barriers that do not exist. We lock ourselves up in that jail of Failure by doubts and fears, that live only in our imaginations.

Some of us have stopped trying, because of past failures—we think there is no use. We think that the door to success has been locked against us. Maybe, if instead of sitting down and giving up, we would just lean against the door, it would swing open.

John L. Sullivan licked his opponents by licking their minds first—by making them fear him.

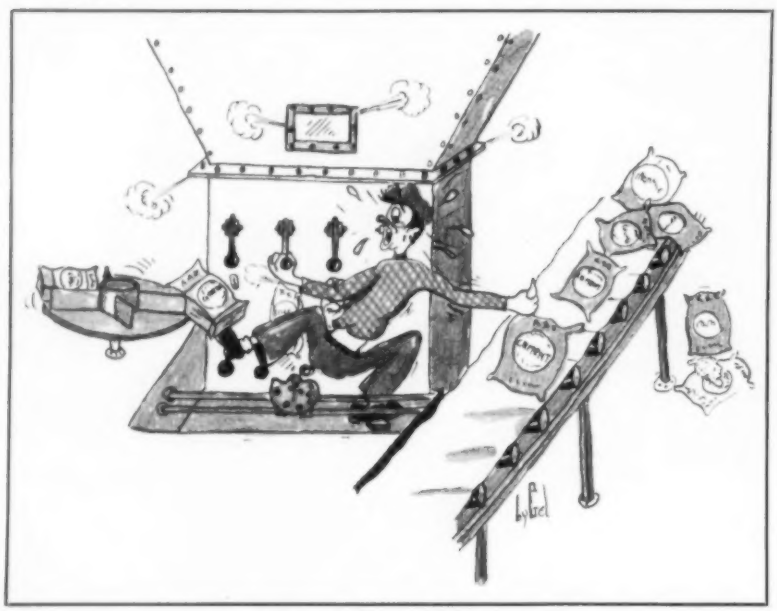
Let's not be licked by MENTAL BARRIERS!

Automicetables

VEGETABLES are getting into the atomic swing of things, too, according to *American Vegetable Grower*.

Potatoes and onions will probably be the first vegetables to benefit from atomic energy. Within the next few years ionizing radation from special machines will probably be used commercially to prevent sprouting and thus prolong the storage life of these important vegetables.

"Irradiation" has become an important byword in the vegetable trade since the conference of potato irradiation at atom-studying Brookhaven National Laboratory. Growers became suddenly aware that the atomic age was not a thing of the future. It is almost here.



A quiet day in the pack house.

Potpourri and Succotash

A newspaper reporter was interviewing a well-known Virginian by telephone. He failed to catch a certain word and asked, "Is that spelled with an L as in Lincoln?"

"Certainly not, suh," roared the Southerner. "It's L . . . as in Lee!"

Behind today's successful man can be found three people: His wife and Mr. and Mrs. Jones.

"Well, young man," said the judge, sternly, "what brought you into this court? Have you anything you wish to say in your defense?"

"Yes, your honor, I have," answered the culprit. "I just finished your book on how anyone can be successful by letting his natural self come forward. Well, I did — and here I am."

A zealous cub reporter, fresh from school, was sent to cover a large charity bazaar at which a beauty queen was to be chosen.

He had just turned in his story when there was a wild roar from the city editor's desk. The boy leaped to attention.

"What do you mean by this?" shouted the editor.

" 'Among the beautiful girls was Aloysius R. Grisly.' Grisly isn't a girl, you idiot. He's one of our principal stockholders!"

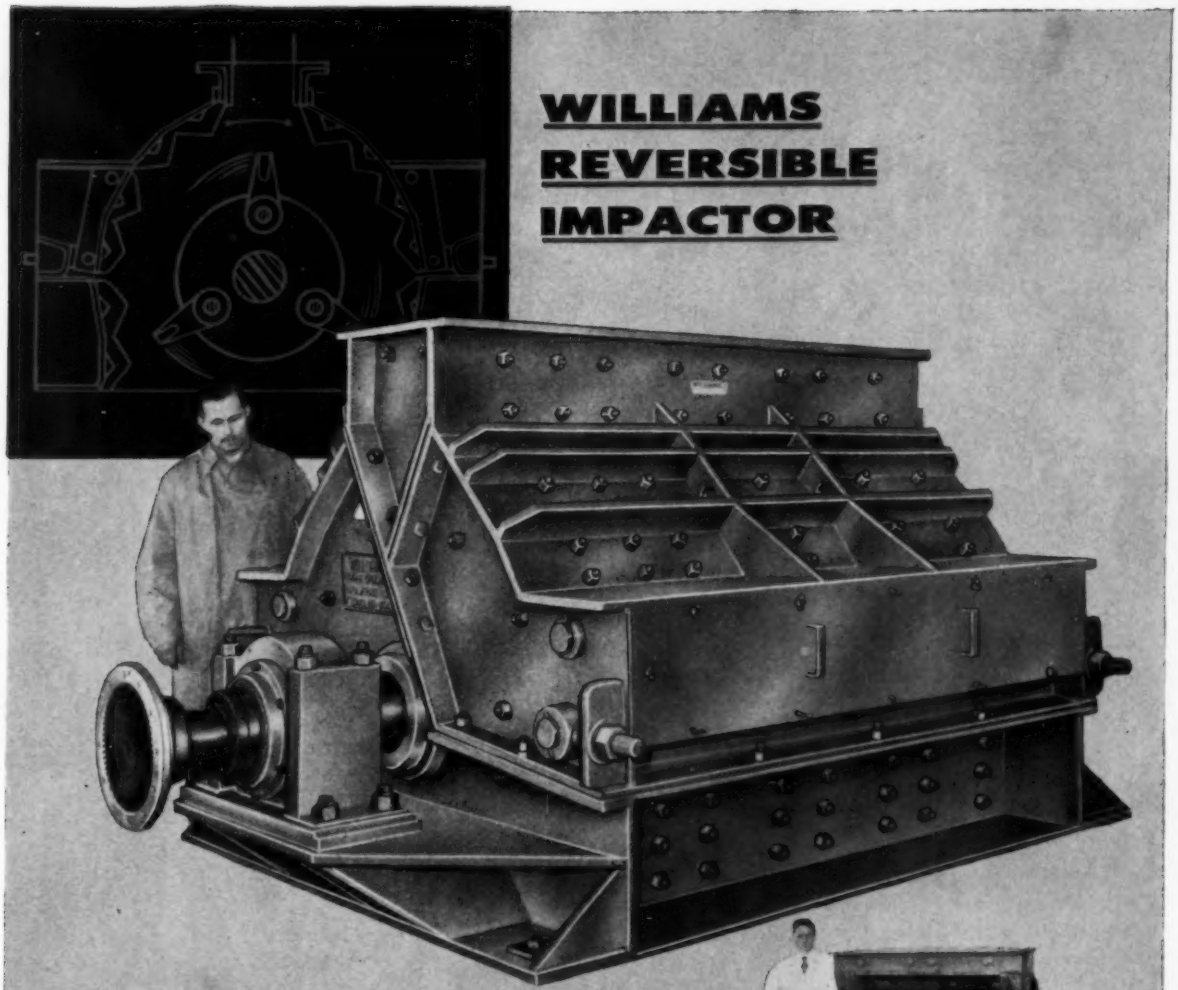
"I can't help it, sir," sputtered the scared, but honest, reporter. "That's where he was!"

The man stopped at the bar after seeing his wife off to their summer cottage.

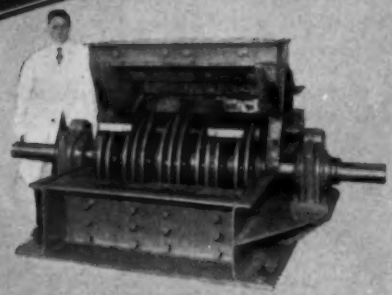
"Gentlemen," he hiccupped, raising his glass in a toast, "My only regret is that I have but only one wife to give to the country."

Four-star delight: W. F. Brown's cartoon in the Post showing a couple on the beach front of one of the large Florida hotels. Says the man, holding a large shell to his ear, "All I hear is a voice saying $40 a day."

WILLIAMS REVERSIBLE IMPACTOR



- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

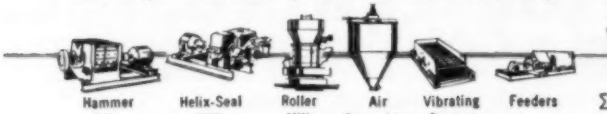


Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 St. Louis Avenue — St. Louis 6, Mo.



WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

You can do your Drying-Grinding-Separating all in ONE Machine

WITH THE RAYMOND Flash Drying IMP MILL

This versatile Imp Mill is a compact unit that does a complete job in minimum space. It provides a clean, dustless, automatic system for a wide range of applications, of which the following are typical:

Handling ball clays directly from the pits . . . reducing initial moisture of about 25% to a final content of 5%, at the same time pulverizing and separating the clay to a fineness of 95% through 100-mesh.

Processing chalk for fillers used in paint and rubber manufacture . . . drying the raw material from 10% down to 2% final moisture while grinding the product to a fineness of 99% passing 100-mesh.

Calcining gypsum for making wallboard . . . . handling raw gypsum containing 25% surface and combined moisture, and delivering the finished product with less than 5% moisture content.

For further details and uses of the Raymond Imp Mill with Flash Drying Accessories, write for Catalog No. 77.

RAYMOND IMP MILL equipped with Flash Drying Accessories, including the new package type furnace.

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Raymond Division

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HERE'S LOADER MOBILITY . . . EXCAVATING STRENGTH

LOADS 1½ CU YD AT A PASS . . . 2¼ yd with light materials bucket. Lifts up to 11,200 lb.

WORKS RIGHT UP ON A STOCKPILE where wheels dig in. Can build stockpiles higher, store many more yards of material in a given area.

TURNS IN ITS TRACKS . . . where many smaller loaders have to jockey.

DIGS INTO HARD-PACKED MATERIAL . . . exerts 20,000-lb break-out force, with 72 net engine hp and modern bucket design.

These are just four examples of how an Allis-Chalmers HD-6G tractor shovel offers a combination of strength, traction, flotation and mobility that enables it to replace a fleet of part-time specialized machines. You can count on it to boost production the year round. Ask your Allis-Chalmers dealer about the HD-6G . . . also the three larger tractor shovels with capacities up to 4 cu yd. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

N.L.A. Holds ...cessful Convention ...t Colorado Springs

A scene at The Broadmoor, Colorado Springs, where the N.L.A. convention was held. The glass-enclosed swimming pool in the foreground is only one of the features of this famous resort.

current market developments, operating methods featured in three-day program

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE 55th annual convention of the National Lime Association, held June 6, 7, and 8, 1957, at The Broadmoor, Colorado Springs, Colo., set new standards in the high caliber of the program and in the selection of a location. The attendance was a near record, and more members brought their wives and families than ever before. The keynote of the meeting was again the development of new markets, with special emphasis on the use of lime stabilization in highway construction. Featured on the program also were two important developments in lime burning which promise to lower the cost of production greatly.

As usual at these meetings, the afternoons were open for enjoyment of the many attractions available at this outstanding resort and the surrounding area. Major sight-seeing features included Pikes Peak, The Garden of the Gods, Cheyenne Mountain, and other world-famous scenic wonders. At the Broadmoor were the golf course, the glass-enclosed pool, the indoor ice skating rink, and many other features. In addition, the association sponsored cocktail parties and receptions, a very enjoyable steak roast at a nearby mountain retreat and, of course, the annual banquet. The annual golf tournament drew many entries, and the cup for low gross was won by Joe O. Sherod of the Warner Company.

Boynton's Report In his report on association activities Robert S. Boynton, general manager of N.L.A., was optimistic about the future of the lime industry but pointed out that potential markets must be developed. The lime road stabilization program is progressing rapidly, and the annual sales for this purpose in 1957 should total at least 120,000 tons. This is, however, only a start, and the potential market should be much greater. The report mentioned the promotional work in this field being done by N.L.A., and the 2-day lime stabilization sales course to be held in Washington in the Fall to train member company salesmen.

Mr. Boynton also mentioned other important or promising markets which are being developed by N.L.A. Progress is being made in improved methods of neutralizing acid wastes with lime, also in the use of lime in autoclaved building products, and in other fields. But there are a number of new developments which are encroaching on existing lime markets, one of the most serious being the trend toward modernistic construction in using glass, steel, and other metals in place of masonry, concrete, and related materials.

Officers and Directors As all officers of N.L.A. are elected for two years, those elected a year ago carry over. They are: president, M. A. Rikard (Southern Cement Company); and treasurer, Paul Sunderland (Ash Grove Lime & Portland Cement Company). Also re-elected were Robert S. Boynton, general manager; Georgia M. Coffman, assistant secre-

tary; Kenneth A. Gutschick, manager, technical services; and Conard M. Kelley, highway engineer.

Ralph L. Dickey (Chemstone Corp.), is the new member of the executive committee; the other members include Reed C. Bye (Warner Co.), Bolton L. Corson (G. & W. H. Corson, Inc.), C. C. Loomis (New England Lime Co.), Amos B. Miner (National Gypsum Co.), Charles E. Rarey (Marble Cliff Quarries Co.), and Wallace E. Wing (Marblehead Lime Co.).

Nine new members of the board of directors were elected, effective July 1, 1958. The board members are as follows:

District 1—C. C. Loomis (New England Lime Co.)

District 2—Bolton L. Corson (G. & W. H. Corson, Inc.); Claude H. Barrick (S. W. Barrick & Sons, Inc.); E. D. Williams Jr. (H. E. Millard Lime & Stone Co.)

District 3—Amos B. Miner (National Gypsum Co.); John M. Junkin (Warner Company); C. Roy Hutchinson (Mercer Lime & Stone Co.)

District 4—Charles E. Brown (Chemstone Corp.); Charles A. Hartman (Peery Lime Co.)

District 5a—John W. Rockwood (Basic, Inc.); Franklin Witmer (Ohio Lime Co.).

District 5b—Charles E. Rarey (Marble Cliff Quarries Co.)

District 6—Stevenson Smith (Limestone Products)

District 7—Wallace E. Wing (Marblehead Lime Co.); R. F. Mathews (Mississippi Lime Co.); E. H. Siebrasse (Menke Stone & Lime Co.)

District 8—V. F. Nast (Western Lime & Cement Co.)

District 9—Paul LaLiberte (Cutler-Magner Co.)

District 10-11—M. A. Rikard (Southern Cement Co.); G. L. Scott, Jr. (Alabaster Lime Co.)

District 12—Paul Sunderland (Ash Grove Lime & Portland Cement Co.); Russel W. Hunt (Southwest Lime Co.)

District 13—J. S. Offutt (U. S. Gypsum Co.); George E. Robinson (Austin White Lime Co.)

District 14—A. Leo Gallagher (Elliston Lime Co., Inc.)

District 15—Kennedy Ellsworth (U. S. Lime Products Co.); Allen Renton (GasprO Ltd., Honolulu, T. H.)

Other Business At this meeting it was decided to hold the 1957 Fall Operating Meeting at the Commodore Perry

Robert S. Boynton, general manager, N.L.A.; M. A. Rikard, president, N.L.A.; and Paul Sunderland, N.L.A. treasurer.

Three of the speakers were, left to right: C. J. Lewis, Colorado School of Mines Research Foundation; F. A. McCoy, Sheffield Steel Division; Merrill Riehl, Mahoning Valley Sanitary District.

Left to right: J. Lewis Powell, U. S. Department of Defense; Robert S. Boynton, general manager of N.L.A.; Conard M. Kelley, highway engineer of N.L.A.

Left to right: Ernest E. Robertson (Winnipeg Supply & Fuel Co.); Chester McDowell, Texas Highway Dept.; John S. Wheeler (Ontario Building Materials Ltd.).

Hotel, Austin, Tex., on October 17 to 19. An excellent program is being prepared, according to C. E. Baxter (Ash Grove Lime & Portland Cement Co.), chairman of the program committee, and an interesting plant tour will be included.

The annual financial report for N.L.A. was presented by Treasurer Paul Sunderland (Ash Grove Lime & Portland Cement Co.). J. S. Offutt (U. S. Gypsum Co.), as chairman of the financial and budget committee, reviewed the activities of the association during the last year and the cost to the association. A slight increase in dues was announced, made necessary by expanded services to members. There had been no change in the dues structure since 1941, when it went down, a truly remarkable record.

Safety In a preliminary report of the results of the 1956 National Lime Assn. safety contest, Kenneth A. Gutschick said that 14 plants experienced no lost time accidents for the year and qualify for the N.L.A. Certificate of Achievement in Safety. Four other plants had accident-free years but their returns had not yet been verified. All of these plants will receive their certificates, and the winners in each of the four classes will receive trophies at the Fall Operating Meeting.

The verified winning plants are:

Group A1—Quarry with calcining plant working 100,000 or more man-hours

1—G. & W. H. Corson, Inc., Plymouth Meeting, Pa.—355,680 man-hours
2—Ash Grove Lime & Portland Cement Co., Galloway plant, Springfield, Mo.—291,735 man-hours
3—United States Gypsum Co., New Braunfels, Tex.—263,604 man-hours
4—Texas Lime Co., Cleburne, Tex.—112,768 man-hours

Group A2—Quarry with calcining plant working less than 100,000 man-hours

1—Lee Lime Co., Lee, Mass.—90,500 man-hours
2—U. S. Lime Products Co., Sloan, Nev.—88,800 man-hours
3—Rockwell Lime Co., Manitowoc, Wis.—47,939 man-hours

Group B—Underground mine with calcining plant

1—Warner Company, Bell plant, Bellefonte, Pa.—552,357 man-hours
2—Marblehead Lime Co., Quincy, Ill.—54,207 man-hours

Group C—Calcining plant only

1—Marblehead Lime Co., Hannibal, Mo.—106,632 man-hours
2—Marblehead Lime Co., South Chicago, Ill.—102,990 man-hours
3—Dow Chemical Co., Ludington, Mich.—96,008 man-hours
4—Ash Grove Lime & Portland Cement Co., Springfield plant, Springfield, Mo.—80,353 man-hours
5—Nytex Chemicals Co., Houston, Tex.—32,513 man-hours

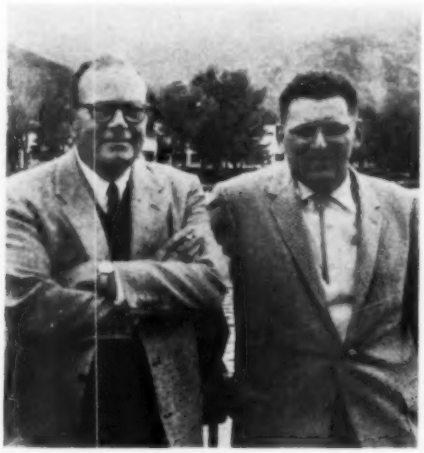
Three of the four plants which had accident-free records not yet verified were in the A1 group. They are:

1—National Gypsum Co., Luckey, Ohio—175,542 man-hours
2—Kelley Island Division of Basic, Inc., Gibsonburg, Ohio—151,922 man-hours
3—Blair Limestone Div., Jones & Laughlin Steel Co., Millville, W. Va.—132,360 man-hours

The fourth plant, in Group C, was the Kelley Island Division of Basic, Inc., Buffalo, N. Y.—80,135 man-hours.

Final data on this contest is not yet available from the U. S. Bureau of Mines, but it seems certain that 1956 was a record year, Mr. Gutschick stated. The accident-frequency rate was the lowest on record, and the severity rate was also low. The total of 18 accident-free plants was also a new record. Some of the N.L.A. plants, he said, also won awards from the Joseph A. Holmes Safety Assn. and from the National Safety Council, and some

Left: Ian Smellie, Calcimatic Co.; Howard R. Spendelow Jr., Electro Metallurgical Co.; John M. Delglish.



Right: Paul F. McCarthy Sr. (Linwood Stone Products Co.); Kenneth A. Gutschick, manager, technical services, of N.L.A.

individual employees won awards for personal heroism.

Research Progress being made in various fields of N.L.A.-sponsored research was also described by Mr. Gutschick. Under the fellowship on acid neutralization at Rutgers University, a series of recent tests was conducted on a sludge return process for the control of calcium sulphate sludge volume following high calcium and dolomitic quicklime neutralization of 1 and 2 percent sulphuric acid. Further studies are to be made on this and other related subjects. He also described two non-lime pickle liquor processes now being developed which emphasize the importance of the Rutgers research. These are the Ruthner process being developed by the Blaw-Knox Co. and the Zahn process brought over from Europe by the Koppers Co.

At Purdue University, Mr. Gutschick reported, a fellowship on coagulating oil emulsiόns with lime and ferric sulphate is winding up this summer. Important practical and theoretical contributions in the field of chemical coagulation have been made. In September, he said, the university will start on a new N.L.A. project which will involve the use of lime for controlling atmospheric pollution caused by acid mists. Specific aims of the study are to determine the possible use of lime in neutralizing acid mists found in different gaseous industrial wastes and as an adsorbent or complexing agent for the removal of organic suspensoids such as originate from petrochemical and refining plants.

The research on lime stabilization of the Universty of Texas has been fruitful, according to Mr. Gutschick, and it has been widely publicized. Current research involves the testing of burned clay obtained from natural deposits as an additive. There is speculation, he said, that these mixtures may serve as paving materials and create an added demand for lime.

The project now under way at the National Bureau of Standards involves investigation of the problem of expansion of mortar. At Franklin Institute work is under way to determine the basic mechanical proportion of various lime and cement-based mortars under conditions of dynamic test. Much progress appears to have been made in establishing that lime adds elasticity to mortar and improves bond.

Lime Stabilization One of the highlights of the convention was the report of Conard M. Kelley, highway engineer for N.L.A., on the progress of the *Lime Stabilization Promotional Program.* This comparatively new use for lime seems to insure a large added market. Since April Mr. Kelley has called on 32 state highway departments and attended 11 highway engineering conferences, traveling 90,000 miles in promoting lime road stabilization. In reporting on the status in various states, he said that Nebraska completed two test sections in 1956, with very satisfactory results. In Missouri a 5-year-old project is in excellent condition. Louisiana is a "hotbed" of stabilization, and 18 contracts have been let using lime. Texas is still the leading user of lime and should use over 50,000 tons in 1957. Projects are scheduled in Kansas, Ohio, Wisconsin, Florida, and Iowa, and prospects are good in Michigan, New York, and Virginia.

Another favorable factor for the lime stabilization program is the fact that the Highway Research Board now has a lime-fly ash committee. The Bureau of Public Roads has been very co-operative, the CAA has revised its book on pavements to include lime in its specifications, and the U. S. Corps of Engineers is conducting research on the use of lime. In closing, Mr. Kelley stated that the expanded highway program offers an excellent field for lime, as 700 tons per mile would be required.

Further information on lime soil stabilization was given by Chester McDowell, senior soils engineer of the Texas Highway Department, who has probably done more pioneering research on this subject than anyone else. He had previously addressed this group on this subject four years ago. Mr. McDowell traced the early structural uses of lime, including its use in India with clay for masonry dams. In Texas, he said, tests on lime soil stabilization have been carried on for 25 years, the first 13 without much success. Then laboratory and field tests were co-ordinated, with excellent results. In 1935 a sand and gravel-lime stabilized open surface road failed. It was 10 years before another test was made. Then results were excellent with the same materials, but with a protective coating. It took seven more years to sell the idea of this type of road but it then was immediately successful. According to Mr. McDowell, England, Russia, Germany, Mexico, and other countries are experimenting with lime-soil stabilization.

Slides were shown of the various road jobs being carried on in Texas. At first bulk end-dump trucks were used to place the lime, but this method was too dusty. They next tried 15-ton bulk tail spreader trucks, with much better results. The lime and soil were mixed in place and then compacted by pneumatic rol-

Left: Mrs. E. D. Williams Jr. (H. E. Millard Lime & Stone Co.); Mrs. John M. Deely Sr. (Lee Lime Corp.); Mrs. Burton A. Ford (St. Regis Paper Co.).

Right: Joe O. Sherod (Warner Co.), possible being quizzed on his winning golf score by C. Roy Hutchinson (Mercer Lime & Stone Co.).

Left: Carl Morris (Basic Chemical Corp.); C. E. Baxter (Ash Grove Lime & Portland Cement Co.).

Right: E. D. Williams Jr. (H. E. Millard Lime & Stone Co.); Charles Rarey (Marble Cliff Quarries Co.); Roger Gleason (Union Bag-Camp Paper Corp.); M. R. Brisch (Rockwell Lime Co.).

lers. Mr. McDowell also described the wet method, in which the lime is unloaded from bulk cars and mixed with water in a pug mill. The resulting mixture is pumped into a tank truck, from which it is sprayed on the road. It is then blade-mixed. In closing, he said that there should be a rapid increase in the use of lime in soils and that there should be a similar market for lime in the construction of tidal basins, etc.

Lime and Uranium *Lime in the Uranium Milling Industry* was the subject discussed by C. J. Lewis, manager of the chemical division, Colorado School of Mines Research Foundation, and formerly a well-known lime industry technical man. This organization is a not-for-profit research foundation specializing in industry-sponsored research in the fields of mining, mineral beneficiation, and chemistry. According to Mr. Lewis, "In recovering uranium from ores, it is necessary that the uranium be taken into solution, so that it can be concentrated by chemical procedures. Either sulphuric acid or sodium carbonate-bicarbonate solutions are used for dissolving uranium from the ore. The choice of acid leaching *versus* alkaline leaching depends largely on the limestone content of the ore. If this limestone content is excessive, the quantity of sulphuric acid required will be impractical, and this requires that a sodium carbonate leach be used. We therefore have what is known as acid leach circuits and alkaline leach circuits for uranium recovery. Lime is not used in the alkaline leach circuit. Our comments on the use of lime in the uranium milling industry are therefore confined to the acid leach circuit." In describing this circuit, Mr. Lewis used a graphic chart of a uranium mill.

"Now lime fits into this picture at three different points," he pointed out. "First, lime is used in conventional water treatment processes for yielding boiler feed water, clarified water for the makeup of reagent solutions, and potable water. I am confident this applicaion is so well appreciated that no further comment thereon is needed.

"The second application for lime is the very important step of neutralizing the acid barrens prior to their discharge to public domain. In the area where most of the uranium mills are located, good water is at a premium, and contamination of normally usable water is not tolerated."

Of the 12 uranium mills operating in the United States, said Mr. Lewis, two require little lime for neutralizing purposes. The other 10 mills process a total of 5,400 tons of ore daily and, at 40 lb. per ton, require 108 tons of calcium oxide equivalent daily. Plants now under construction would use an additional 81 tons daily. The Canadian market is even larger, as the expected capacity for 35,000 tons of ore daily will require about 700 tons of calcium oxide for neutralization.

A third point of lime use is at the precipitaion stage of uranuim concentrate cake, where it is used to conserve the more expensive caustic and ammonia. It is estimated that daily quicklime requirements for this purpose might reach 8 tons in this country and 20 tons in Canada.

There is, according to Mr. Lewis, another potential application of lime in the nuclear program for radioactive waste treatment. These wastes present a serious disposal problem, and any widespread use of atomic reactors for domestc power would have to be preceded by a satisfactory method of disposing of these wastes. A promising method is the absorption of these wastes into clay, so that they enter its structure. The clay is then sintered to a fraction of the original waste volume, after which it is buried in deep mines or in a restricted area. Lime, said Mr. Lewis, might find application as an absorbent or catalyst in this process.

Role of Lime in Steel Industry The role of lime in the manufacture of steel and the significance of the newer methods being used were described by F. A. McCoy, works metallurgist, Sheffield Steel Division of Armco Steel Corporation. With national ingot production 120,000,000 tons annually, the requirement is for 32,000,000 tons of blast furnace stone, 7,000,000 tons of open-hearth stone, and 1,000,000 tons of open-hearth and electric furnace burned lime.

Mr. McCoy first described in detail the requirements for each of these purposes, the methods used, and the functions of the stone or lime in them. Charts were shown which illustrated the preliminary analysis of the steel and of the slag and corresponding analysis during the burn which showed the changes taking place.

Military Planning with U. S. Industry One of the most interesting and best-received features of the meeting was the address entitled *Collapse of Time* by J. Lewis Powell, program co-ordinator, Supply and Logistics, U. S. Department of Defense. In his talk Mr. Powell gave a thumbnail description of the Production Allocation Program, interlarded with sparkling bits of humor which held his audience's full attention. Mr. Powell first used a chalk diagram to illustrate the mechanical and

(*Continued on page* 86)

Helping Lehigh Portland Cement Co. keep production *HIGH*

Moving overburden to reach coquina shell at Flagler Beach, Fla.

Three loading stations fill rail cars with finished cement at the Bunnell, Fla., plant of Lehigh Portland Cement Co. It takes a busy, complex operation to keep these loading stations on the go. The operation begins beneath the Florida sand, where coquina shell is found. It is the principal raw material—used here for the first time in the U. S.—in the making of Portland cement.

Two giant Caterpillar DW21s, with No. 470 Scrapers push-loaded by a D8, move the sand overburden so a bucket can get at the shell. This is a job that calls for fast cycle time and plenty of stamina. The CAT* DW21 (Series C) supplies both. Powered by a Cat Turbocharged Diesel Engine with a maximum output of 300 HP, the DW21 can range in speed all the way from 2.3 to 25.1 MPH. It develops rimpulls up to 38,420 lb. It shifts easily, up or down, and steering is smooth. Its steering wheel really controls the unit, responding the way an automobile does. Its big wide-sectioned 29.5 x 29 tubeless tires give maximum flotation and traction and bring real cost savings over old-fashioned tubes and flaps.

Its partner, the No. 470 Scraper, incorporates a new, advanced engineering concept—LOWBOWL design. Here's a scraper that gets capacity loads in a hurry—18 yards struck, 25 heaped. It features a wider, longer bowl that holds more *heaped* yardage, with lower sides that cut overhead weight and internal friction.

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WILL DEMONSTRATE**

Lake Asbestos of Quebec

AT Black Lake, Quebec, Canada, Lake Asbestos of Quebec, Ltd., a wholly-owned subsidiary of American Smelting and Refining Company, New York, is developing an asbestos mine and building a mill that will produce about 100,000 tons of asbestos fiber a year, approximately a 10 percent addition to Canada's production and a 7 percent addition to the free world's supply of this raw material.

The project is unique in that the ore lies under a lake which is the key feature in the drainage system of a populated area of very heavy rainfall. Readying the ore deposit for open-pit mining involves removal of about 37,000,000 cu. yd. of overburden, of which about 30,000,000 cu. yd. will be removed by dredging and pumping, and 7,000,000 by mechanical means (power shovels and trucks), and draining the lake. (By comparison, in the construction of the St. Lawrence Seaway, about 18,000,000 cu. yd. of material will be dredged, although the problems and objectives, of course, are not the same.) This enormous amount of material to be dredged, control of drainage during the work, and provision for flood control to replace the regulating effect of the lake, pose unusual problems and require a tremendous capital investment.

It is estimated that by the time asbestos is being produced in 1958, $32,500,000 will have been invested, including $9,200,000 for the mill. At that time, too, engineers will have, in the experience of this pioneering venture, a new textbook on submarine mining which will be applicable to development of other ore bodies under lakes and the like that may be discovered or that are known but, up to now, have been judged too difficult to develop.

The development is also an outstanding example of international cooperation whereby Canadian natural resources are being brought into use for the benefit of Canada through

An aerial view of the Black Lake, Quebec, area where a new producer, a subsidiary of American Smelting and Refining Company, is spending over $30,000,000 to develop the asbestos ore body under the lake. At right center, construction is under way on the $9,200,000 mill and companion structures.

development of new mine and mill requires draining lake, moving huge overburden

the investment of American capital and the engineering skills of both nations. Under the agreement by which the American Smelting and Refining Company undertook the development, with the Canadian company holding mining rights to the Black Lake deposit, Asarco is to supply the necessary capital for the development of the property, and operate it for the life of the ore bodies on a profit-sharing basis.

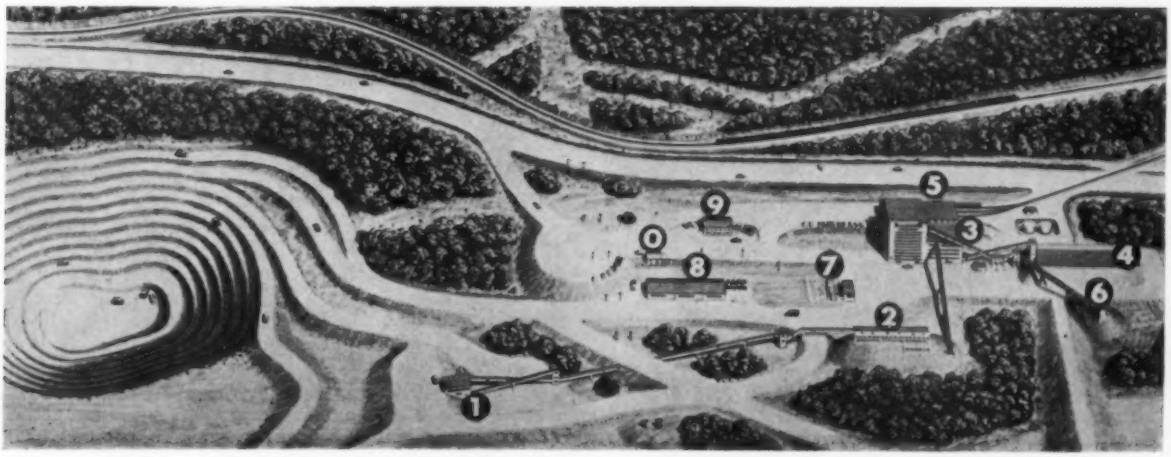
Black Lake History

The Province of Quebec, where Black Lake is located, produces about 60 percent of the world's asbestos fiber. Just north of the lake, which is about 2 miles long and a half-mile wide, is the town of Black Lake (population, 5,000), and 4½ miles farther north is the town of Thetford Mines (population, 20,000). In this Thetford Mines-Black Lake mine district, asbestos is the principal industry. There are seven mines and mills, and huge tailings piles give evidence of long years of working these deposits. (The other principal mine district of the two which account for the major portion of Canadian production is 45 miles south, at Asbestos.)

Since asbestos deposits have been mined on either side of Black Lake for many years, it was a reasonable assumption to expect that the ore extended under the lake. However, until a few years ago, the tremendous engineering problems and costs involved in developing such deposits precluded exploration under the 500-acre lake. Then the success of draining and dredging operations to recover iron ore from deposits in the Steep Rock area of southern Ontario, near the Minnesota border, made the Black Lake potential seem more favorable to Canadian engineers. Consequently the Black Lake ore body was staked on January 1, 1948, and, with mining rights granted by the Crown, the first test hole was drilled in August of that year. Exploration carried on during the winter months

Shown here in operation by the east shore of the lake, the dredge pumps mud and silt from the lake bottom and material monitored from shore slopes to disposal areas.

Numbered in this architect's drawing of the new asbestos facility are: 1, primary crusher; 2, wet rock storage; 3, dryers; 4, dry rock storage; 5, 14-story mill; 6, tailings conveyor and disposal; 7, power substation; 8, shop and garages; 9, offices; 0, change house.



Driven by a 6,000-hp. motor, this 30-in. centrifugal pump on the dredge transfers an average of 1,000,000 cu. yd. of material per month. It is estimated that the dredge will handle about 30,000,000 cu. yd. of the total 37,000,000 cu. yd. of overburden to be removed.

Monitors on the lake shore, supplied from pumps on auxiliary barges, wash down soft clays that would be difficult to handle mechanically for subsequent removal from the lake by the dredge.

was done by drilling with drill rigs set on the ice.

At this time the United Asbestos Corporation Ltd. was formed, and funds were obtained through public subscription to carry on the work. A 6 by 16-ft. shaft started on the east side of the lake for underground exploration in 1950 was completed in the spring of 1951 at a depth of 570 ft. from the shaft collar. This shaft, 40 ft. of which now stands above dry ground, was originally located in the lake and was gradually connected to the shore by filling in with material excavated in this phase of the mining exploration.

Underground development followed as tunnels and drifts were drilled to explore this deposit, known as the "A" ore body. Another, known as "C" ore body, was located beneath a granite island on the west side of the lake. (A third ore body is indicated in the center of the lake, but this needs further development, and only the two ore bodies figure in present plans.) The fiber in these deposits was found to be of above-average quality.

United Asbestos, most of whose shares are owned by Canadians, had invested from $1,000,000 to $2,000,000 in exploration operations, but did not have the tremendous capital needed to bring the property into full production. In seeking financial aid, management brought the development to the attention of Asarco. To Asarco, a nonferrous metals producer with annual sales exceeding $500,000,000, the project was both a challenging opportunity to put its large capital and engineering resources to work in a new field, and a step toward diversification of its industrial interests.

United Asbestos granted Asarco an option to provide the necessary funds for development of the property and operate it on a profit-sharing basis. Asarco was to: (1) develop the deposit; (2) equip the property with a mill to treat 4,000 tons of ore per day; (3) receive 75 percent of the proceeds until the capital investment was recovered (the proceeds then to be split according to a formula based on the grade of ore being mined and milled); and (4) have complete freedom of operation during the life of the ore body.

Following checks on the exploration already done, further drilling, and actual milling of ore to determine the yield, value, type of equipment needed for the job, etc., Asarco exercised the option in May, 1954. By this time some 120,000 ft. of diamond drilling, part surface and part underground, had been carried out, and 30,000 tons of ore had been mined. The existence of deposits sufficient for 40 years had been established.

Construction Aggregates Corporation of Chicago, the company carrying on the Steep Rock dredging in Ontario, was granted the contract for dredging. The C.A.C. contract called for construction of a suction dredge to remove the silt from the lake bottom, and for draining the lake prior to the start of open-pit mining of the "A" and "C" ore bodies. Open-pit mining was selected rather than underground methods, on the basis of the geology of the area and other factors. But in either case, the mud and silt would have had to be removed to guard against contamination of the asbestos by organic matter; the latter would char at the high curing temperature employed in asbestos processing, and thus degrade the product.

The Hydraulics Problem

Although Black Lake is inevitably compared with Steep Rock, which is a larger job, it stands alone not only in that this is the first time suction dredging has been employed for asbestos, but in the difficulty of the hydraulics problems involved. For example, the Black Lake area has an annual rainfall of 44 in. (compared with about 20 for Steep Rock); it is in a fairly well populated area, so that the effect of alterations in drainage patterns on existing towns and other factors involving settled areas must be considered (compared with the wilderness state of Steep Rock); and the material on the side of the lake is soft and must be carefully terraced to protect the mining pit from mud slides. At Steep Rock an area with solid rock on either side has been gouged out.

The towns of Thetford Mines and Black Lake are in the valley of the Becancour River, which drains a 40-50 mile area and runs into and out of Black Lake in its route to the St. Lawrence River, 75 miles away. With the lake to be drained eventually, the Becancour River had to be diverted, as a first step. This was accomplished by digging a new river channel, 8,000

ft. long, which bypasses the lake across the north side. The new channel is generally 70 ft. wide, but at the upper end, a 4,000 ft. section is 500 ft. wide, forming a pond area to prevent back water from raising the level of the Becancour upstream during flood stages. Just below this diversion channel, the Becancour had to be widened and deepened, and a dam had to be built to control the flow down the river.

About 6 miles farther down the Becancour as it flows west, before it enters another lake, Trout Lake, a dam had to be constructed across the latter. This structure is to regulate the flow of the Becancour downstream during flood stages by forming another flood plain area to compensate for the regulating effect of Black Lake, which has been removed from the water circuit.

At its south end, Black Lake has a narrow neck originally 142 acres in size. A drainage basin of 8 to 10 square miles drains into this end of the lake, and this neck had to be dammed off and overflow water diverted from this South Neck Dam to the river by a ditch which also intercepts runoff waters from the hills. Since the South Neck has become a storage basin, it is about 300 acres in size, but it will become smaller as it is filled in with excavated material and eventually tailings.

In addition to the drainage ditch running from South Neck, ditches had to be provided all around the lake to intercept surface runoff and carry it to the river channel. All the diversion and drainage structures were designed to handle maximum runoff, which can amount to 7 in. of rain in a 24-hour period. These banks and dikes have roadways built on them which can handle heavy equipment such as tractors and 22-ton pit trucks. All are being reinforced with material removed during stripping operations at the ore body sites.

An integral part of the hydraulic system is the disposal of waste, including that from the dredging operations. Not only must there be areas to deposit the silt as it is pumped out, but provision had to be made to return the water from this mud and silt to the lake to maintain a water level satisfactory for dredging at any stage. If needed, makeup water can be diverted from the river diversion channel through a controlled gate-and-canal system. Conversely, when the level of the lake must be lowered, water is wasted to the river channel instead of being returned to the lake.

The main disposal area, designated "C" disposal area, is about 3 miles west of the lake. This area, with a maximum length of about 6,700 ft. and a maximum width of about 4,700 ft., has a capacity of about 25,000,000 cu. yd. of material. Two other disposal areas, "A" and "B," are on the opposite sides of the diversion channel at the north end of the lake. All are diked off, three dams, for example, having been built at "C" area as a part of the dike system. Each is 70 to 80 ft. high at the highest point and has a 200-ft. wide top and a base about 1,000 ft. wide at its widest point.

Decantation towers are located in these areas to carry the water from dumped mud and silt back to the lake *via* return ditches. These towers are structures having an open steel post frame that is gradually closed with timber stop-logs to a point above the settled mud as the level of the water rises. Water free of mud and silt continually flows in toward the tower from the pool where the dredge pipeline is discharging. The water, being at a higher level than the barrier logs, flows into the tower and down two pipelines at the bottom of the tower which run to the ditch. These pipelines—one 48 in. and the other 32 in.—have to be vented since much air is trapped in the tower as the water flows down.

To provide this elaborate hydraulic system with suitable waste disposal areas, a considerable amount of land around the lake had to be acquired. It was necessary, too, to secure approval of plans for the entire project from the Provincial Government, which gave the company expropriation rights in certain instances. However, most of the land was purchased by direct negotiations with owners.

Highway Diversion

In addition to changing the drainage of the area, Highway No. 1 running along the east side of the lake had to be moved to make way for the project. This involved replacing the existing highway with 1.9 miles of class A highway having a 46-in. subgrade and 22-ft. wide paving. The cost was $364,000, of which Lake Asbestos paid 90 percent. The Quebec Central Railroad, which passes the property on the east, did not have to be disturbed. A spur has been brought into the property.

Dredging Operations

The dredge which C.A.C. constructed for Lake Asbestos was shipped in 11 sections and assembled on the site. Its dimensions are 140 ft. by 40 ft., and its weight about 200 tons. Powered electrically, it has a 75-ft. cutter and suction ladder. The cutting head is 7 ft. in diameter and 8 ft. long; and it has special alloy steel teeth welded on a spiral cutting edge. This cutter fits over the suction end of the pipeline and dislodges the material, so that it can be removed hydraulically. The cutter is driven by an 800-hp. motor; a reduction

Mechanical removal of overburden is handled, as shown here on the 750-ft. elevation, with shovels and haulage trucks. Between the truck and the dredge (background) is the 710-ft. elevation.

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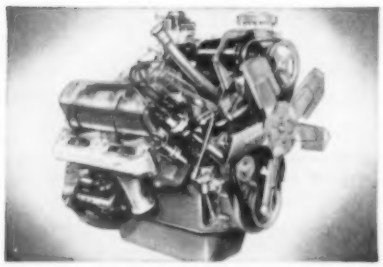
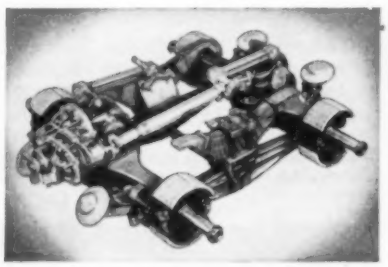
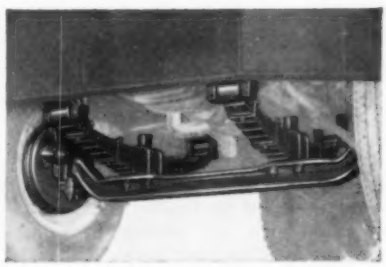


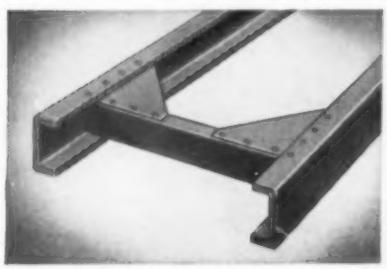
1 **Most V-8 power in any truck,** 257 hp. New Heavy-duty VF-230 models have load-moving ability unlimited, power to haul the biggest loads. Other six-wheeler engines include sixes and new V-8's—gasoline, LPG and diesels up to 356 hp.



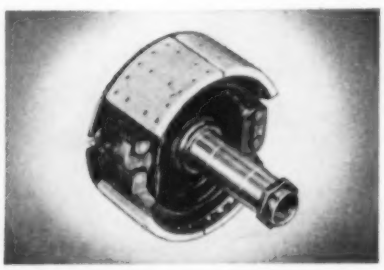
2 **INTERNATIONAL tandems** give longer, more dependable life. This heavy-duty, double reduction unit has 50,000 lbs. capacity. Sturdy cast steel housings. Third differential with lock transmits power smoothly and evenly to each axle.



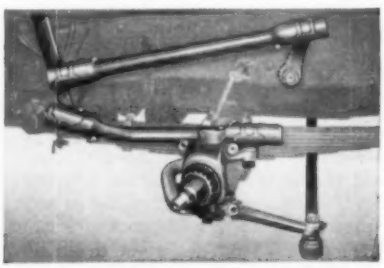
3 **Balanced heavy-duty front end** for maximum loading, added stability and longer life. 15,000 lbs. capacity heat-treated high carbon steel axle, 4-inch wide springs, threaded pins and bushings. Built to take the big jobs in stride.



4 **INTERNATIONAL steel-flex frames** combine great strength with proper flexibility. New models have deep, double channels made of heat-treated alloy steel. Reinforced cross-members with husky gussets for sturdy, lasting tandem suspension.



5 **Efficient, fast-acting air brakes** are standard on Heavy-duty VF-230—17½ in. x 3 in. front, 16½ in. x 7 in. rear with 1,162 sq. in. total lining area. Other six-wheel models with brake types and sizes to match load and operation *exactly*.

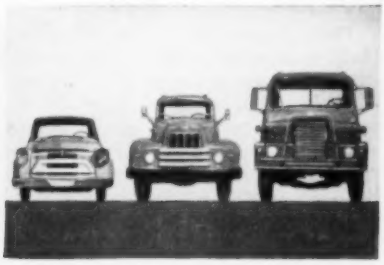


6 **True geometric steering** provides easier handling and outstanding maneuverability. Heavy-duty gears are cam and roller-mounted twin lever type. Controls mounted *ahead* of the front axle. Power steering standard on this new model.

Latest addition to the world's most popular line of six-wheel trucks—new INTERNATIONAL Heavy-duty VF-230 with 60,000 lbs. GVW. Built to absorb severe shock loads, to stand up under the most extreme applications. Engine is the industry's most powerful V-8, *257 hp.* Other new off-highway V-8 six-wheelers available, plus models from 22,000 to 76,800 lbs. GVW in conventional and COE design. Complete selection of all-wheel-drive models, too.

7 Heavy-duty, functional construction. Fenders are 12 gauge diamond tread steel plate, welded and reinforced for extra strength and long life. Massive, sturdy bumpers and guards. Rugged reinforced support for front tow pin.

8 INTERNATIONAL also offers a complete line of all-wheel drive models for the tough, off-highway operations. Completely factory-built, 7,000 to 43,000 lbs. GVW. Low height with ample ground clearance Complete selection of equipment available.



9 World's most complete line. There is an INTERNATIONAL "tailor-made" for *every* job, half-tonners to 96,000 pounders. Choice of 4-wheel, 6-wheel and all-wheel-drive models, conventional and COE design. Every one built to cost *least* to own!

drive reduces the revolutions of the shaft and head from 900 r.p.m. to 24 r.p.m.

The 30-in. centrifugal pump on the dredge is driven by a 6,000-hp. motor. About 10 ft. in diameter, the pump has a rock trap which may go unattended as long as 48 hours. At other times, depending upon the material being removed, it may be jammed with large boulders as often as 40 times a shift.

The material is pumped out through a pontoon-supported pipeline that was originally 3,200 ft. long. Of welded steel, 32-in. outside diameter with ¾-in. thick walls, each 50-ft. length of the pipeline weighs 6½ tons. The section along the shore is also 32-in. outside diameter, but it has a ½-in. thick wall, and each 50-ft. length weighs 4 tons. (The heavier pipe was not deemed necessary on shore, where ruptures would not be so difficult to repair.) There are some 25,000 ft. of shoreline pipe carrying dredged material to the disposal areas. In addition, Lake Asbestos has 4,000 ft. of supplementary pipe.

The dredge pump, which has a capacity of about 50,000 g.p.m., is periodically turned around, and water is pumped out of the lake and thrown in a tremendous stream up on the slopes of the lake basin to wash down soft clays and other material into the lake. Monitoring, as this operation is called, thus makes possible easy removal—by dredging—of material that otherwise would be difficult, if not impossible, to haul away mechanically. In addition to the occasional use of the dredge for monitoring, there are two monitoring barges, with much smaller pumps, which are in continuous use for the same purpose.

There is also a 30-in. booster suction pump, driven by a 6,000-hp. motor, located on the shore. Another half-mile along the shoreline, there is a second booster station with a 30-in. pump driven by a 2,500-hp. motor.

These large pumps were all originally constructed with standard steel casings. However, alloy steel had to be substituted because of the abrasive wear of the rocks and mud in the constant flow along the line. At least four have already been worn out on the job; and normally two or three are being rebuilt at all times.

From one position, the dredge can swing about 250 ft., cutting a bank 250 by 30 by 8 ft. It will cut a bank of that size in about 40 minutes if the material is soft, and in about an hour if more indurated. The dredge is moved by swinging on one of its spuds, or iron cylinders, mounted aft for maneuvering. (The operator lets each down alternately, swinging on it, and thus "walking" the dredge on the spuds.)

Rate of removal depends on the material dredged—sand, loose mud, or boulder clay. The dredge can pump 1,400,000 cu. yd. per month in very soft material; the minimum is 400,000 cu. yd. per month; the average, 1,000,000 cu. yd. per month. (In one 24-hour day, however, a top performance of 79,000 cu. yd. of mud removed was achieved.) Average composition of the material is about 17 percent solids, so that the quantity of material passing through the pipeline is about 50,000 g.p.m. Auxiliary equipment mounted on the dredge includes a hoist, compressors, and a 300-kv. standby diesel generator.

The dredging plans call for a terraced contour with various cuts so arranged as to give safe slopes to the solid material left behind, and to protect the open pit against mud slides. This is accomplished, as has been mentioned, by carefully controlling the lake level through the hydraulic system.

Among the auxiliary marine equipment operating with the dredge are the following:

1. A *cable reel barge* for paying out and reeling in the 5-in. diameter submarine power cable.

2. *Two tugs*, each powered by a 275-hp. diesel, one of which is equipped for ice breaking to permit operations in sub-zero weather, when the ice reaches 3½ ft. in thickness.

3. A *derrick barge* with a diesel-driven hoist to handle pontoon lines, and such heavy equipment as cutting heads.

4. A *small monitor barge* with two 3,000-g.p.m. pumps for washing down material from slopes for subsequent dredging as noted previously.

5. A *diamond drill*, originally used to drill on ice, and now mounted on a barge for drilling in the once-a-day blasting operations that loosen the overburden on the bottom of the lake.

6. A *large pump barge* with a 400-hp. electric motor that can pump 5,000 g.p.m. to lower the water level and to monitor slopes.

Present plans call for dredging to be completed early in 1959. So far, approximately 19,000,000 cu. yd. of material have been removed.

Total cost of the dredge, pontoon, and shore lines, booster stations and power auxiliaries is about $3,000,000. When dredging is completed, the *Fleur de Lis*, as the dredge is called, will have well paid for itself since mechanical removal of the same amount of material dredged would have cost three times as much. However, it is quite likely that the dredge will be put to work elsewhere. It can be dismantled, shipped, and reassembled; and either as the *Fleur de Lis* or under another name, it can tackle any job requiring a 30-in. dredge.

Power

Electric power is supplied by the Shawinigan Water & Power Company. To meet the Lake Asbestos needs, a new 66-kv. line 4 miles long had to be installed from Thetford Mines at a cost of $447,570; this cost is subject to a reduction to $309,000 through refunds on the basis of power consumption.

Shawinigan also had to put in a private line from the southern end of the lake, across the west shore, to the No. 1 booster pump. Three transformers were installed at this station.

Total power consumption equals 16,500 hp. (14,500 for pumps; 800 for the cutter head on the dredge; and the rest for accessory equipment). The two 66-kv. motors for the dredge and No. 1 booster pump were built especially by Westinghouse. When mine and mill are in normal operation, power requirements will be about one-half the present total. In addition there are a number of welding machines in constant use, rebuilding dredge and pump parts, five of which are electric. (A gas unit is used for portable work on the line.)

Among the other pieces of equipment are the following: three 4-cu. yd. shovels; a fleet of 18 22-ton trucks, six tractors, and other shovels—a 3-cu. yd., a 1½-cu. yd., and a ¾-cu. yd.

Mining Operations

Although dredging will continue until early in 1959, the lake should be low enough in mid-1958 to allow initial mining operations and tune-up operations in the mill. Open-pit mining should be possible for about 20 years; after that underground methods will probably be necessary.

Ore reserves are presently estimated at 47,000,000 tons, and the mill will have a capacity of 5,000 tons of ore per day. The stripping (waste) ratio will vary, but should average about 3:1 of the ore.

Since prevention of contamination is very important in asbestos mining and milling, the ore body must be carefully cleaned before initial operations are started. (Workers are required to enter compounds set aside in enclosed areas of the mill for a smoke.)

"A" ore body will start at about elevation 630 ft., "C" at about 670 ft. (The original lake level was 750 ft.; it is now about 693 ft., and it will be 530 ft. when drained.) Open-pit operations will go down about 500 ft., and then they may be extended another 500 ft. by underground operations.

Milling Operations

A contract for construction of the $9,200,000 mill has been let to the F. H. McGraw Company of Canada Ltd., and the project is well advanced. Although it will not have the unique features present in the mining phase, the mill will have the most modern production equipment and quality control facilities to provide superior processing and yield a high-quality product. All test work has shown that the Black Lake ore bodies are of such quality that the mill will produce all grades of asbestos, from the longest to the shortest fibers.

Primary function of milling is, naturally, to separate the asbestos fiber from the serpentine host rock. This is accomplished by repeated crushing, fiberizing, removing free fiber by suction, and screening the freed fibers to remove rock and dust.

Ore will be fed to a large primary reduction unit—a 48- by 60-in. jaw crusher. Crushed to a maximum size of about 6 in., the rock will go to trommel screens, which will separate the plus 4-in. ore for feed to the secondary crushers. The product of the secondary crusher, a gyratory, together with the fraction screened out after primary crushing, will go to wet storage.

Since dry rock is necessary for efficient mill operation, the rock will be dried by cascading through a current of hot air, conditions of time and temperature varying with the moisture content of the rock. The dried product, reduced to less than 3-in. size, will be processed through another gyratory crusher and then conveyed to dry storage. From this point on, the process will be essentially one of air separation.

Crushed ore from dry storage will be fed to heavy shaking screens equipped with powerful air suction hoods. The shaking action will screen out the sand, and as the ore moves along, the fiber will rise through the rock fragments to the top, to be removed by suction as it passes under the hood. These free fibers—the first separated—will be lifted and fed to two shaking screens which will separate them into long, medium, and short fractions.

The rock from this first vibrating screen will then go to a further crushing stage for reduction to about ¼-in. It will then be again subjected to passage over a shaking screen equipped with a suction hood to remove fiber. Finally, rock from this screening is to be fed, together with the smaller material from the initial rock screening, to a fiberizer.

This device, which breaks the rock by the impact of high-speed hammers, has a more severe action than that of the crusher, which breaks the rock by compression. Hence, it is not applied until the longer, more valuable fibers have been removed. Ore from the fiberizer, like material from the crushers, will be fed to shaking screens for further separation of the fiber by suction.

The product will be cleaned and graded by feeding the fibers to cyclone collectors through which the heavier fractions, comprised of rock particles and unopened fibers, fall vertically, the air suction drawing the lighter asbestos fibers off sideways. Subsequent grading according to length will be done in passage through flat or rotary screens.

The grading screens will have three sections, each covered with a wire cloth of a different mesh. Fibers fed into one end of the screen are processed by revolving paddles, which force the short lengths through the screen of the first section and eject the longest grades at the end. Each grade will then fall on a flat cleaning screen for removal of sand, dust, and unmilled splinters. Waste from all screening operations, normally about 90 percent of the original ore, will be conveyed to tailings dumps.

The air collection system in the mill will handle an accumulation of very fine fibers, known as "floats," for discharge in a "float" shed. (These vary in size from less than a micron to about ¼-in. in length.)

The different standard grades—spinning (group 3), shingle (group 4), paper (group 5), stucco and plaster (group 6), and shorts (group 7)—will be thus collected. Bagging will be done with pressure packing, and the bags will be shipped on pallets.

The mill, which is to be the main building at Black Lake, will be 150 ft. wide by 260 ft. long (including the drier section) and 130 ft. high. A structure equivalent to a 14-story building, it will be entirely enclosed.

Other buildings completing the mine and mill, in addition to the primary crusher, wet rock storage and dry rock storage, already mentioned, include an electric substation, shops and garages, company offices, and change house.

Personnel

Currently there are about 660 employed on the project, 272 of whom are Lake Asbestos personnel, 115 C.A.C. men, and 273 McGraw workers. When the mill and mine are in operation, some 425 persons will be employed.

President of Lake Asbestos of Quebec is Robert D. Bradford, who also is a vice-president and director of Asarco. General manager of the Canadian company is Michael J. Messel.

Eight Trap Rock Workers Receive Safety Awards

Eight employees of New York Trap Rock Corporation recently received special recognition for their leadership in the field of industrial safety at a dinner given for them at the Empire State Country Club, Spring Valley, N.Y. Nearly 120 persons, including representatives of the United States Bureau of Mines and New York State safety agencies, were present to honor the veteran employees.

Each of the men has worked 41 or more years in stone quarries without suffering a disabling injury on the job. They are John Eagan, who has 69 years; Angelo DiMartino, 51 years; Frank Covati, 45 years; Walter Bobb, 43 years; George Kelleher, 42 years; and Bernard Finn, Bernard Grall, and George Keenan, all with 41 years.

These men were presented with certificates of honor from the Joseph A. Holmes Safety Association, a nation-wide organization sponsored by the Bureau of Mines, to give recognition for outstanding safety accomplishments and heroic acts in mining and allied industries. The men also received cufflink sets of sterling silver, set with polished trap rock, as a memento from the company.

Presentations were made by Joseph D. Fackenthal, executive vice-president and general counsel, New York Trap Rock, and Seymour B. Fleming, safety director.

R. K. Humphries, vice-president and general manager of Pacific Cement & Aggregates, Inc., since 1950, has been elected president by directors of the firm. Mr. Humphries succeeds A. K. Humphries, president since 1938, who was promoted to the newly-created position of chairman of the board.

Second Annual Board Meeting Of N.C.L.I. Held in Chicago

By BUREN C. HEROD

THE second mid-year board meeting of the National Crushed Limestone Institute, held June 19 at the Edgewater Beach Hotel, Chicago, Ill., gave evidence of the fact that this young organization has come a long way toward solving many of the problems faced by a new organization.

With J. B. Mount (Shouns Lime Co., Shouns, Tenn.), N.C.L.I. president, as presiding officer, the board met in general session to consider points raised at committee meetings held the preceding evening.

Among the subjects taken under consideration were the N.C.L.I.'s participation and contribution toward a sound-color movie being produced by the A.R.B.A., membership activities, current legislative activities, and a program for the 1958 convention. With respect to the latter, a motion was passed to schedule the coming annual meeting on January 24—the day subsequent to the N.A.L.I. meeting, as was done last January.

In view of the enthusiastic reaction and comments on the excellence of the program of the last convention, the suggestion was made that Robert M. Koch, N.C.L.I. executive vice-president, attempt to obtain and schedule speakers of the high caliber who participated in the program for that gathering. At that time, several prominent representatives of Congress and the A.R.B.A., including Senator Albert Gore (Tenn.) and J. N. Robertson, president of A.R.B.A., took part in that program. In discussing the second color motion picture with technical and national details of modern highway construction, it was noted that a certain amount of film footage may be devoted to illustrating typical quarry operation.

Discussion of membership drives included a comment by Joseph J. Griesemer (Griesemer Quarry, Springfield, Mo.) that these efforts could be substantially aided if individual members would lay the groundwork in their respective areas for calls to be made later by the staff. The proposal to make special dues provisions for new members whose applications are processed after June 1 of a given year was also made and accepted.

In the legislative field, the board members discussed several factors related to depreciation deductions for tax purposes. Consideration is being given to establish a written summary of the depreciation situation and industry reaction with a view toward presenting this material to Congress for consideration and possible inclusion in future tax legislation. Prior to the conclusion of the meeting the one-third of the board whose terms expire at the end of the current year in accordance with the procedure set up at the last annual meeting were re-nominated to three-year terms. A vote will be taken by letter ballot from the membership in the near future, it was indicated.

Samuel Omasta, Washington, D.C.; Roger Ivey (Ivey Crushing and Construction Co., Mineral Point, Wis.), director; Arthur Overgaard (Arthur Overgaard Co., Elroy, Wis.), regional vice-president, and Leonard S. Fry (Fry Coal & Stone Co., Mercersburg, Pa.), director.

N.C.L.I. officers and directors in attendance included: Robert M. Koch, executive vice-president, and the following directors: Paul W. Seitz (May Sand & Gravel Corp., Fort Wayne, Ind.), Robert E. Meshberger (Meshberger Stone Co., Inc., Columbus, Ind.), Leonard S. Fry (Fry Coal & Stone Co., Mercersburg, Pa.), Merritt L. Hulett (Schuylerville, N.Y.), and A. F. Dunkin (The Muncie Stone & Lime Co., Inc., Muncie, Ind.).

At a recent meeting of the directors of the Coplay Cement Manufacturing Company, Coplay, Pa., EUGENE BLUM was elected chairman of the board and M. E. GRUNEWALD was named president.

Other officers elected at the same meeting include DAVID J. UHLE, first vice-president; MILTON S. STEINER, secretary; LOUIS STAMBERG, vice-president and treasurer; and THOMAS BURDA, assistant secretary and assistant treasurer.

1 *Extra-long cylinder sleeve overlap* for perfect alignment during the dump cycle.

2 *Chevron-type packing rings* hold maximum hydraulic pressures safely.

3 *Wiper Rings* guard packing and cylinder walls from scoring.

4 *Spherical bearing base mounting* of cylinder prevents side strain on cylinder sleeves.

5 *Hydraulic inlet located at top of cylinder* eliminates possibility of oil loss through control valve.

6 *Manganese bronze bearings* throughout assure smooth, trouble-free action and long life.

7 *Plunger-type control valve is fully balanced,* with *snap-in control* positions, *integral pressure relief and check valves.*

8 *High-pressure Heil Perma-Pump,* mounted in-line with power take-off, delivers dependable lifting capacity.

9 *Complete hoist frame* is part of unit, actually reinforces truck frame, provides simple, low-cost mounting on any truck; no fixed projections below top of truck chassis.

10 *Wide hinges and large-diameter hinge through-shaft* assure stable dumping action with heaviest loads.

11 *Two types of easy-acting lever controls available,* plus *finger-tip* torsion bar tailgate release mechanism.

12 *Air vent at cylinder top* vents air from cylinder with finger-tip action—no wrenches required.

13 *Cast steel external packing glands* reinforce cylinder sleeve ends and protect from "flaring."

14 *New standard SAE "O" ring and 37° flared pressure fittings* instead of conventional pipe thread fittings in all pressure lines.

Ask for Heil advanced-design dump bodies and hoists. The Heil name plate is your assurance of a dependable hauling unit—with engineered features for money-making performance on the toughest earth-moving or quarrying operations.

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DUMP BODIES and HOISTS

Blast-Furnace Slag Output Tops 35,000,000 Tons in '56 To Establish New Record

Despite a halt of several weeks in slag production, due to a steel strike, output of processed iron blast-furnace slag in 1956 totaled a record 35,000,000 short tons, valued at almost $50,000,000—the largest in the history of the industry. This compares with 32,000,000 tons, valued at $46,000,000, in 1955. These statistics were compiled from a canvass conducted by the National Slag Association in co-operation with the U.S. Bureau of Mines. Included are the production figures of 45 companies. These firms operate 65 plants processing air-cooled slag, 19 plants processing granulated slag, and 21 plants producing expanded slag.

Screened air-cooled slag, the major product, increased 3 percent to 25,572,388 short tons, valued at $38,476,208. Of this total 23,522,678 short tons, or 92 percent, was used as railroad ballast, aggregate in portland cement concrete construction, bituminous construction of all types, and miscellaneous highway and airport construction. Other principal uses for this type of slag were in manufacturing concrete block, mineral wool, roofing aggregates, and as a trickling filter medium.

Unscreened air-cooled slag output totaled 2,096,479 short tons, valued at $1,280,037—more than doubling the 1955 figures. About 60 percent of this material was used as aggregate in highway and airport construction.

The production of **granulated slag** in 1956 totaled a record 4,634 703 short tons—an increase of 21 percent over the 1955 figure (the 1955 total also increased over 1954 by 11 percent). Of the 1956 volume, 44 percent was used as a raw material in the manufacture of hydraulic cement, 41 percent in highway construction, and the remainder in the manufacture of concrete block, agricultural slag and liming, and miscellaneous items.

Expanded slag production in 1956 reached still another record—2,990,177 short tons, valued at $8,495,818—increases of 3 and 7 percent, respectively, compared with the 1955 figures. The bulk of the material was used in the manufacture of lightweight concrete block and as an aggregate in lightweight concrete.

Iron blast-furnace slag was produced in 15 states, but the major quantity is processed in the steel centers of Ohio, Pennsylvania, and Alabama, and the remainder in California, Colorado, Illinois, Indiana, Kentucky, Maryland, Michigan, Minnesota, New York, Tennessee, Texas, and West Virginia.

Two New Cement Plants Planned for Erection in Ghana

Plans for the establishment of a cement grinding plant at Takoradi, Ghana, have been announced by Kojo Botsio, minister of commerce and industry. An agreement signed by Mr. Botsio and M. A. Mackintosh, deputy managing director of the Tunnel Portland Company, Ltd., also contains an option for a similar grinding plant at Tema.

Under the agreement, a new company will be formed to operate the plant. The Ghana government and the Tunnel Portland Co. and its associates will share in providing the capital. Facilities will be provided to train Ghanaian personnel.

Why Not Campaign for a Stamp To Honor Nonmetallic Mining Industries?

By HAROLD J. ASHE

AMOUNTING number of professions, trades, industries, and economic groups are being honored by the issuance of a commemorative postage stamp by the United States Post Office Department. A commemorative postage stamp paying tribute to the mining industry is long overdue. It may well be that nonmetallic mining is the subject, if a little push is given in the right direction.

Owners and executives in the nonmetallic mining industry may feel that issuance of such a commemorative postage stamp is a remote prospect, even consider asking for a stamp as presumptuous. Such an attitude fails to take note of the current trend in United States commemorative postage stamps.

The first commemorative postage stamps were issued by the Post Office Department in 1893. Known as the Columbian issue, these stamps were issued in recognition of the 400th anniversary of the discovery of America by Columbus, coincident with the World's Fair in Chicago in that year.

During the next 50 years several hundred commemorative stamps were issued. During this period (1893-1943) commemorative stamps were used exclusively to honor famous persons, historical events, public shrines and monuments, parks, and similar subjects. Starting in 1944, commemorative stamps began to appear which recognized the importance of industries, professions, groups, and associations. In that year four stamps were issued honoring the following industries: railroad, steamship, telegraph, and motion picture.

Since that year special stamps have been printed honoring youth, the poultry industry, volunteer firemen, the American Bankers Association, the Boy Scouts, the American Chemical Society, 4H Clubs, the American Automobile Association the Baltimore & Ohio Railroad, newspaper boys, civil engineers, the American Bar Association, the trucking industry, the American Institute of Architects, the steel industry, and many others.

Why not a stamp honoring the nonmetallic mining industry and all of its segments, both past and present? In all modesty, this industry has as much claim to commemorative postage stamp recognition as bankers, poultry raisers, lawyers, newspaper boys, and commercial haulers.

However, this recognition of the industry and its importance in the American economy won't likely be given unless it is vigorously sought after. This is one non-controversial project on which all branches of the industry can unite. Both employers and employees can work for such a commemorative stamp if they are minded to do so.

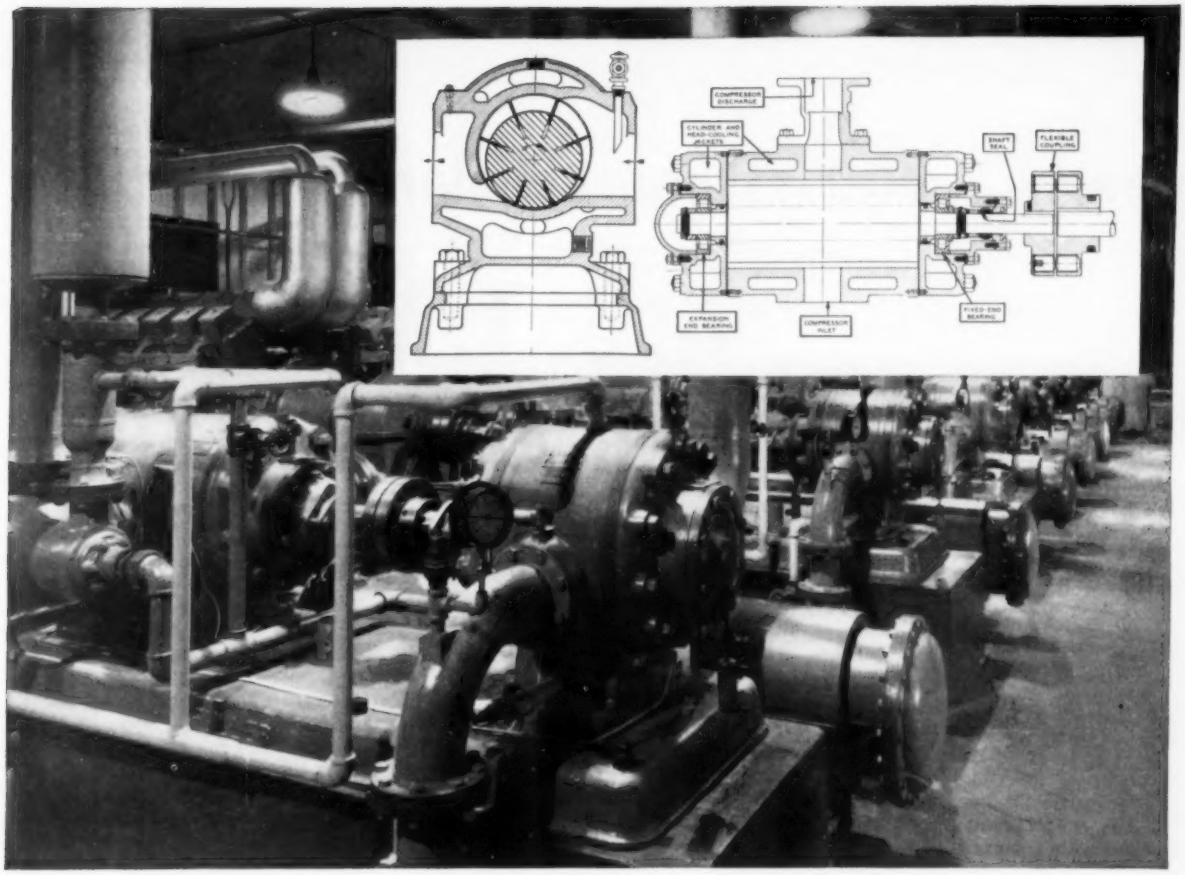
What needs to be done? Here are a few suggestions.

1. Get organizations and associations of both employers and employees at all levels to pass resolutions asking for the issuance of such a commemorative postage stamp. Such resolution should be backed by cogent reasons showing why this honor is deserved and long overdue.

2. Urge individual members of the industry, including employees, to write letters to congressmen enlisting their support.

3. Contact the Postmaster General, Washington, D. C.

4. See that national association representatives in Washington are directed to make personal contacts which will get the ball rolling.



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5. COMPACTNESS—Large capacity in relation to size results in lighter weight. 6. EASE OF INSTALLATION—In smaller sizes, no foundation is needed. Larger units need only concrete slab for foundation. Automatic safety controls are incorporated in package. 7. ECONOMY—Few moving parts of the compressor, and their accessibility, reduce maintenance to the minimum. 8. VERSATILITY—Unit can be operated at various conditions. Capacity variation of 50% can be obtained by change of speed with engine, turbine, or two-speed motor drives.

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60th Annual Meeting

A record-breaking total of 2,932 representatives of industry and government convened in Atlantic City, N. J., for a week of technical sessions and committee meetings designed to promote knowledge of all types of materials of engineering and to standardize specifications and methods of testing. During the week of June 17, the American Society for Testing Materials held 31 general sessions and approximately 575 committee meetings.

Those sessions which were concerned primarily with cements, aggregates, and concrete products began on Monday evening with Lowell E. Gregg, consulting engineer, Lexington, Ky., presiding. A paper on the *Freeze-Thaw Resistance of Concrete as Affected by Methods of Tests* was presented by H. L. Flack, materials engineer, Bureau of Reclamation, Denver, Colo. Mr. Flack discussed the influence of factors which might explain in part the lack of agreement among results of tests utilizing different laboratory freeze-thaw cycles, and in some instances possible reasons for the poor correlation between laboratory indicated durability and the service records of field structures.

Several combinations of freezing and thawing periods, including the four tentative A.S.T.M. methods, were used to test the effect of initial cures, degree of saturation, and specimen size and shape. A special feature of the paper was a revelation of

By C. E. PROUDLEY

Chief Materials Engineer
North Carolina State Highway Commission

time-temperature relations established for different locations in an 18-in. cylindrical specimen simulating the relative effect on structural concrete of various patterns of freezing and thawing. The following conclusions were drawn by Mr. Flack:

"1. Freezing and thawing resistance of fog-cured air-entrained concrete is directly proportional to the length of the fog-curing period. However, if the fog-curing period is terminated after 7, 14, or 28 days and controlled drying at 50 percent RH is substituted, the concrete will develop many times greater resistance than companion concrete continuously fog-cured to the same age.

"2. Air-entrained concrete under moist freezing and thawing conditions absorbs water at a much lower rate than non-air entrained concrete.

"3. No appreciable effect was noted in the results obtained from the different methods of test performed on bars and cylinders due to changes in length of cycle or in the use of different freezing and thawing temperatures; however, large differences were observed between tests in which freezing of specimens was performed in different media, that is, in water or in air.

"4. Less variance in test results was obtained in the Test No. 3 (slow water method) which consists of 24-hour periods of freezing at a temperature of 0 deg. F. and thawing at a temperature of 70 deg. F.

"5. In spite of the wide variation within tests, all methods of test investigated evaluated the different concretes in the same relative order.

"6. Regardless of the test method, air-entrained concrete was much more durable than non-air-entrained concrete."

Richard T. Kropf, newly-elected president of the American Society for Testing Materials, is vice-president and director of research for Belding Heminway Company, Inc., and vice-president and general manager of Belding Corticelli Industries, Inc.

A novel method for comparing behavior of reinforced concrete beams similar in all respects except for characteristics of the reinforcing steel used was described by M. J. Greaves in a paper co-authored with F. T.

Mavis. The work was performed in the Department of Civil Engineering in the Carnegie Institute of Technology. Oscilloscopes and a high-speed motion picture camera were used to record the failures. Application of the load was simultaneous and equal in rate through a unique linkage. Fluctuations of load and reaction as measured by strain links could be detected at intervals as short as 0.03 millisecond. Among the observations made by Mr. Greaves was that rail steel withstands impact loads better than intermediate-grade reinforcing steel. Also that it appeared that only 3 percent elongation of the bars developed at any time prior to failure, regardless of the test value for elongation of the bars.

Ready-Mixed Concrete

New data on the performance of concrete truck-mixers were included in a paper by Albert G. Timms, consulting engineer, Worthington Corporation, Plainfield, N. J. Inclined-axis type of truck-mixers were tested under field conditions.

Canadian researchers in concrete recently became aware that reactive aggregates are a problem in Canada, as well as in the United States. E. G. Swenson, Division of Building Research, National Research Council of Canada, told of difficulties in identifying reactive aggregates used in a bridge. The mortar-bar test, A.S.T.M. Designation C 227, and the Conrow Test, A.S.T.M. Designation C 342, failed to indicate that the aggregates were reactive, although in one portion of the bridge the sand component was shown to be reactive in the Conrow Test. Phyllite present in the coarse aggregate used in another section of the bridge is believed to have been the cause of the alkali-aggregate reaction. This was indicated by a chemical test and petrographic evaluation.

Abnormal expansion and map-cracking of concrete was reported by Mr. Swenson as having occurred in such structures as sidewalks, curbs, floors, and foundation walls in which a dolomitic limestone coarse aggregate was used. In this instance petrographic examination indicated that the constituents of dolomitic limestone could be regarded as not normally reactive with high-alkali cements. Neither the mortar-bar tests nor the Conrow Tests suspected the limestone as being reactive, although concrete prisms made with this material and a high-alkali cement expanded and cracked within a few weeks when subjected to high humidity conditions or to a wetting and drying test.

Highlights . . .

2,923 attendance registered
31 general sessions
575 committee meetings
technical problems discussed
specification revisions proposed .

A number of admixtures were used to determine their effectiveness in reducing abnormal expansion with high-alkali cement. A 25 percent replacement of cement by weight with calcined shale was most effective. Fly ash was less effective, and it was found that the mere reduction of the cement content by 25 percent with no addition reduced the expansion nearly as much as the fly ash. A finely divided, non-pozzolanic silt reduced the expansion by about the same amount. Addition of 1 percent of lithium chloride had about the same effect. These results after 8 to 11 months seemed to indicate that pozzolanic or chemical admixtures of the type usually found to be effective in controlling cement-aggregate reaction have less beneficial influence than usual in this case.

Stanton Walker, director of engineering, National Sand and Gravel Association, Washington, D. C., received the second Frank E. Richart Award in recognition of his notable contributions in the field of concrete and concrete aggregates. Mr. Walker was the co-author, with D. L. Bloem, of a paper on flexural strength of concrete.

Quality Control

It was appropriate that Edward A. Abdun-Nur, consulting engineer, Denver, Colo., and Lewis H. Tuthill, concrete engineer, California State Department of Water Resources, Sacramento, Calif., should prepare and present a paper entitled *Designing Progressive Specifications for Quality Control of Concrete.* With the increasing emphasis on speed of construction, quality control is assuming more importance to compensate for speed; winter work; increasing costs; and shortages of materials, labor, and technical personnel. Many industrial operations have used quality control successfully for many years. A "designed" specification developed specifically to meet varying job conditions and control requirements can result in superior uniformity, with reduced costs and increased life of the facility.

The importance of A.S.T.M. work in the fields of reference standards, reference specifications, and use of statistics for control was emphasized by Mr. Tuthill, who presented the paper. He pointed out that specification work is often delegated to an employee of minor rank, compared to that of the designer, in most organizations. Development of specifications should be entrusted only to creative engineers with broad experience and with full understanding of (1) design, (2) construction, (3) materials, (4) contracts, (5) control and inspection, and with (6) progressive philosophy of engineering.

The speaker listed among the important items for consideration in designing specifications the admonition to "choose quality desired and be willing to pay for it." He also recommended the use of "self-functioning" features such as electric

moisture meters, water-reducing admixtures to help maintain a uniform water-and-cement content in summer and winter, automatic dispensing equipment for admixtures, use of pigmented curing compounds, and automatic equipment for application of the curing compounds.

It was also suggested that modifications for uniformity, such as permitting reductions in cement factor with improvement in uniformity as measured by strength and, conversely, application of penalties for lack of uniformity, would provide a degree of control without detailed supervision. This procedure, however, necessitates an understanding of the use of statistical methods which should be applied wherever possible. The paper, as prepared by the authors, gives many details of the provisions which they recommend for a designed specification for quality control of concrete.

The following night the second session, continuing subjects pertaining to portland cement concrete, was under the direction of R. R. Litehiser, Engineer of Tests, Ohio State Highway Testing Laboratory. The program began with a paper entitled *Insulating Concretes and Compressive Strength* by Morton Sherman of the Zonolite Company, Research Laboratory, Evanston, Ill. Mr. Sherman made comparisons of lightweight insulating concrete with vermiculite concrete ranging in weight from 25 to 40 p.c.f. oven-dried. Some of the assumptions heretofore made with regard to characteristics of insulating concrete, which have been applied similarly to those for dense aggregate concretes, have been found to be erroneous. For example, the data presented in the paper indicates the following:

"1. The effect of loading rate on the measured strength does not appear to be as critical as a variation in the dry density of the concrete under test.

"2. Abnormal specimen height at casting can facilitate the formation of density gradients in the concrete specimen to be tested.

"3. Without abnormal specimen heights, the height-width ratio of a test specimen can vary from 0.5 to 2.0 without seriously affecting the measured strength.

"4. Improper curing can decrease the measured compression strength."

A method of testing was suggested by Mr. Sherman utilizing 2-in. oven dry cubes.

Further studies of *Flexural Strength of Concrete* made by the

K. B. Woods, director, Joint Highway Research Project, Purdue University, who is chairman of Committee D-4, recommended revisions of the tentative specifications for crushed stone and other aggregates.

National Sand and Gravel Association and the National Ready Mixed Concrete Association were reported in a paper by Stanton Walker and D. L. Bloem. Effects of variations in testing procedures described by Mr. Bloem recommend the need for a review of current procedures and indicate that flexural strength tests are not suitable as a quantitative basis for acceptance or rejection of concrete. The investigation provided data on modulus of rupture for (1) different positions of beams as molded; (2) five methods of applying load; (3) beams of different cross sections; (4) sawed versus molded beams; and (5) different moisture conditions of specimens and ages at test. In the summary of indications of test results, the highlights were stated to be largely consistent with the work of other researchers. They are briefly as follows:

"1. For the concrete of moderate richness and slump used, measured modulus of rupture was unaffected by the position of the beam during loading in relation to its position as molded.

"2. Failure to provide unrestrained bearing during loading did not significantly change the measured modulus of rupture.

"3. Introduction of nearly maximum torsion during loading signficantly reduced the measured modulus of rupture.

"4. Uneven bearing at the reaction and load points (but with the opportunity for torsion eliminated) did not significantly affect the measured modulus of rupture.

"5. The third-point loading device pictured in A.S.T.M. Method C 78 gave lower strengths than the other acceptable device, which employed rollers rather than rockers at the lower bearing points.

"6. Measured modulus of rupture decreased as depth of beam increased.

"7. For concrete made with a hard quartz gravel, measured modulus of rupture was considerably lower for sawed than for molded beams.

"9. There was evidence that, other factors being comparable, thoroughly dry concrete produced higher flexural strength than moist concrete.

"10. Partial drying of wet concrete caused substantial reductions in measured modulus of rupture.

"11. Large differences in flexural strength-producing properties of two coarse aggregates, shown for conditions of standard curing, tended to disappear when the concrete was permitted to dry. The strength differences remained negligible after the concrete was resoaked.

"12. For each of 16 different coarse aggregates, there was an excellent relationship between modulus of rupture and compressive strength, although the flexural strength corresponding to a given compressive strength varied considerably among the different aggregates."

Rate of Hardening of Concrete

In a paper by T. M. Kelly and D. E. Bryant of the Master Builders Company, Cleveland, Ohio, the so-called time of set of concrete was recognized as being subject to various interpretations, depending on the use of concrete. Mr. Kelly described a procedure for measuring the rate of hardening of concrete by bond pull-out pins. It consists of the determination of the rate of development of bond strength with stainless steel pins which were imbedded vertically in a concrete specimen immediately after the concrete was mixed. Individual pins were pulled out at increasing time intervals, and the force required to cause bond failures was measured in each case. It was concluded that "the test method has the advantage of permitting rate of hardening studies of the concrete as a whole, without removing any of its components or subjecting it to abnormal manipulation. Tests may be made with actual job-mixed concrete under conditions of placement and exposure closely approximating those prevailing on the particular job."

The data presented showed that the rate of hardening of concrete was significantly affected by changes in

water-cement ratio, consistency, air content, and storage temperature. In addition, it was shown that the accelerating or retarding effects of temperature upon rate of hardening may be compensated for by the use of suitable retarders or accelerators, added in the proper quantities. Such quantities, for given temperature conditions and concreting materials, can be determined by means of the pin pullout test method described.

Wear tests on concrete using the German Standard Method of test were described by James L. Sawyer, research chemist, Lone Star Cement Research Laboratory. Research workers including Subcommittee III-M of A.S.T.M. Committee C-9 have been searching for years for a suitable abrasion test, as have also the Germans, who have recently developed a machine and method which is their Standard DIN 51951.

The German test, developed by Fritz Ebener, duplicates a practical wear condition by rolling steel balls under pressure over the concrete surface. The concrete surface is subjected to abrasion caused mainly by rolling and sliding friction, accompanied by some pounding or beating force. Mr. Sawyer stated that the test is sensitive to differences in mix and curing procedures. The results are reproducible and easily obtained and indicate that adequate curing is essential for good wear resistance.

Masonry Units

The 29th session of the meeting, presided over by Miles N. Clair, president, The Thompson and Lichtner Company, Inc., Brookline, Mass., began with a paper by E. L. Saxer and H. T. Toennies (National Concrete Masonry Association) on *Measuring Shrinkage of Concrete Block* (Comparison of Test Methods). The masonry units included in the tests were made with five different aggregates and cured by low-pressure steam or by autoclaving.

A survey of recent disintegration of mortar in brick walls was reported by C. C. Connor and W. E. Okerson of the New Jersey Bell Telephone Company, Newark, N. J. As far as could be determined, mortars containing cement having more than 0.6 percent of sodium oxide equivalent were consistently associated with the disintegration; but where the cement had a lower alkali content, disintegration either did not occur or was very slight. Brick with heavy sanding tended to increase the mortar disintegration, but rough-surfaced brick reduced it, as did also good workmanship; but these were not controlling factors. It appeared that the temperature of the bricklaying

Walter Charles Voss, professor emeritus and lecturer, Department of Building Engineering and Construction, M. I. T., Cambridge, Mass., received the A.S.T.M. Award of work, including both administrative and support of A.S.T.M. research and standards work, including both administrative and technical aspects, especially in Committee C-7 on Lime, which he headed for ten years.

period, double tooling, and the sands and limes used exerted no influence.

Carl A. Menzel, consultant, Concrete Technical Problems, Portland Cement Association, Chicago, presented test data in a paper entitled *Fallacies in the Current Per Cent of Total Absorption Method for Determining and Limiting the Moisture Content of Concrete Block*. It was indicated that the long-standing test for moisture content described in A.S.T.M. Method C-140 is inadequate, in that it fails to give a significant and realistic indication of the moisture condition of the concrete. This is needed to show whether or not block are at the desired degree of dryness to reduce drying shrinkage and cracking in the wall. Mr. Menzel recommends prompt replacement of the total absorption method by the relative humidity method reported by him at the A.S.T.M. meeting in June, 1955, and appearing in the proceedings of the Society, volume 55, page 1085. It is claimed that the relative humidity method not only provides a more reliable indication of pertinent characteristics but can be performed in less than 2 percent of the time required by the A.S.T.M. Method.

Committee Reports

Users of A.S.T.M. specifications and test methods are especially interested in actions taken by the committees in the development or revision of standards and tentative standards. Committee C-1 on Cement under the chairmanship of R. R. Litehiser, proposed a number of revisions. Among the most significant of these was the one pertaining to Tentative Specifications for Portland Blast-Furnace Slag Cement (C 205-56T), in which the air content for type IS-A which has been "16±4." It is recommended that this be changed to "19±3 percent." It was further recommended that a change be made in the limits for air content of type IP-A pertaining to Portland - Pozzolan Cement (C 340-55T) and type SA in Tentative Specifications for Slag Cement (C 358-55T), raising the current 18±3 to "19±3 per cent."

A special report of the Subcommittee on the Cement Reference Laboratory entitled *History of the Cement Reference Laboratory, 1929 to 1955*, describing the conception, development, and accomplishments of one of Committee C-9's best known projects, was assembled by John R. Dwyer, supervisor of the project over the period covered by the report. This special report will be published as an appendix to the Report of Committee C-1.

The passing of two members of Committee C-1 — H. F. Kichline, director of research and chief chemist, North American Cement Corporation, and L. W. Walter (retired) an honorary member of the committee — was reported with regret.

Committee C-3 on Chemical-Resistant Mortars is publishing for information a *Method of Test for Compressive Strength of Chemically Setting Silicate-Type Chemical - Resistant Mortars* and also *Recommended Practices for Use of Chemically Setting Silicate - Type Chemical-Resistant Mortars, and of Hydraulic Cement Mortars.*

Committee C-7 on Lime recommends that revisions of Standard Specifications for Quicklime and Hydrated Lime for Silica Brick Manufacture (C 49-42), and Standard Methods of Sampling, Inspection, Packing and Marking of Quicklime and Lime Products (C 50-27) be referred to the letter ballot of A.S.T.M.

At last year's annual meeting considerable attention was given to the use of fly ash as an admixture in portland cement concrete. Committee C-9 on Concrete and Concrete Aggregates (chairman, Walter H. Price, Engineering Laboratories, Bureau of Reclamation, Denver) is now recommending certain revisions in the Tentative Methods of

Sampling and Testing Fly Ash and also the Tentative Specifications for Fly Ash. Most important of the proposed revisions is the change in the specifications (C 350-54T) now limiting the silicon dioxide requirement to 40.0 percent plus, to read, "silicon dioxide (SiO_2) plus aluminum oxide (Al_2O_3) plus iron oxide (Fe_2O_3) min., percent . . . 70.0."

Committee C-9, in a continuation of its efforts to improve the interpretation of test methods pertaining to alkali-reactive aggregates, is recommending revisions of Tentative Method of Test for Potential Reactivity of Aggregates (Chemical Method) C 289-54T by adding a new section 15 on the interpretation of results. The new section not only calls attention to the posibility of erroneous interpretation of results of tests by this method but also gives five references to published data by Mielenz and Witte, Mielenz and Greene, William Lerch, and F. O. Slate; all references have been published either in the proceedings of the Society or as A.S.T.M special technical publications.

The Standard Method of Making and Curing Concrete Compression and Flexural Test Specimens in the Field (C 31-55), is being revised with recommendation for immediate adoption to give added emphasis to the necessity for care in the fabrication and curing of test specimens, especially during the first 24 hours.

Tentative Specifications for Aggregates for Masonry Grout are being proposed by Committee C-12 on Mortars for Unit Masonry, R. E. Copeland, National Concrete Masonry Association, chairman. General characteristics of the aggregates are described as natural sand or manufactured sand, used alone or in combination with coarse aggregate, the coarse aggregate having a maximum size of not greater than ½ in. (size No. 8 or No. 89). Limiting values for deleterious substances, organic impurities, soundness, and gradation are included.

Concrete pipe, reinforced, sewer, and culvert, formerly specified in C 75 and C 76, respectively, are recommended for adoption in a new tentative specification for Reinforced-Concrete Culvert, Storm Drain, and Sewer Pipe (C 76-57T), and simultaneous recommendations are being made for the withdrawal of current C 75 and C 76 as standards.

Committee C 13 on Concrete Pipe under the chairmanship of Mr. Litehiser also recommends revisions in the Standard Specifications for Concrete Sewer Pipe (C 14-56) by adding at the end of the section on cement a clause permitting the optional use of portland - pozzolan cement (A.S.T.M. Designation C 40).

A new section 20 is to be added to C 14 pertaining to the hydrostatic test and a new section 28 added stating that "pipe may be repaired, if necessary, because of occasional imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the purchaser, the repairs are sound and properly finished and cured and the repaired pipe conforms to the requirements of these specifications."

Structural Granite and Roofing Slate

A specification has been proposed for structural granite by Committee C-18 on Natural Building Stones. The specification covers the selection, sampling, and testing of granite for specific construction uses. Test requirements are tabulated in two groups: (1) granite that has performed satisfactorily under environmental conditions similar to those of the intended use for a period of 50 years or more and (2) those for 50 years or less. An engineering grade such as would be used in bridge piers, bridge substructures, flexural members, traffic controls, curbs, etc., is recognized by suitable limits for compressive strength and percentage of wear by the Los Angeles Abrasion Test, and another grade for architectural purposes such as monumental buildings, institutional buildings, commercial buildings, residential buildings, landscaping, parks, etc. It is also permissible for the designer to specify the color desired and the natural variations in color and texture, through reference to granites having the required characteristics. "Granite containing minerals that cause objectionable stain upon exposure should be excluded."

Committee C-18 recommends a Tentative Specification for Roofing Slate for both sloping roofs and also square or rectangular tiles for flat roof coverings. Three grades are mentioned based on service periods of 75 to 100 years, 40 to 75 years, and 20 to 40 years. Each of these grades is required to have a modulus of rupture across the grain of not less than 9,000 psi, but the maximum absorption for each grade is established at 0.25 for the best grade identified as S_1; 0.36 for the S_2 grade; and 0.45 for the S_3 grade, which has the short life. Other requirements cover dimensions, color, nail holes, imperfections, and procedures for sampling and testing. An unusual paragraph pertaining to cost of testing states that "if the samples meet the specification requirements, the cost of testing shall be paid by the purchaser. If the samples fail to meet the requirements, the cost shall be paid by the producer."

Members of a subcommittee of Committee D-4 on Road and Paving Materials believe that modern highways have so little use for paving brick and granite block pavements that they are recommending deletion of the following standards:

D 57-20 Specifications for Materials for Cement Granite Filler for Brick and Stone Block Pavements.

D 58-37 Specifications for Granite Block for Pavements.

D 112-30 Specifications for Coal-Tar Pitch for Stone Block Filler.

D 132-39 Specifications for Granite Block for Durax Pavements.

A letter ballot of Committee D-4 will be taken on these proposals. It will be interesting to observe whether the recommendation will be passed on to an A.S.T.M. letter ballot, as is required by regulations, before any action becomes final.

Committee D-4 under the chairmanship of K. B. Woods, director, Joint Highway Research Project, Purdue University, has recommended to the society revisions of the Tentative Specifications for Crushed Stone, Crushed Slag, and Gravel for Single or Multiple Bituminous Surface Treatment (D 1139-55T), in which a table of requirements for deleterious substances in the sizes retained on a No. 4 sieve has been amplified. The new requirements are given in the accompanying table.

Deleterious Substances	Maximum Percentage by Weight of Total Sample
Clay lumps	0.10
Soft particles	2.5
Chert readily distegrating (soundness test, 5 cycles)	1.0
Oven-dry material floating on liquid with s.g. of 2.0[a]	1.0
Flat or elongated pieces[b]	
Aggregate sizes No. 5 and 6	5.0
Aggregate sizes No. 7 and 8	10.0
Aggregate size No. 9	no requirement

[a] This requirement does not apply to blast-furnace slag.

[b] Pieces in which the ratio of the maximum to minimum dimensions of its circumscribing rectangular prism is greater than five.

Proposed revised Tentative Specifications for Crushed Stone, Crushed Slag, and Crushed Gravel for Dry-Bound or Water-Bound Macadam Base Courses (D 694) is being published but is still being given close scrutiny by the responsible subcommittee looking toward still further important revisions.

Cement Handling Expedited By Self-Unloading Vessel Of Ponce Products, Inc.

RATHER widely divergent engineering efforts were combined toward a common goal, a few months ago, when bulk-cement-handling techniques were joined with naval architecture—resulting in what is described as the first self-unloading sea-going vessel to utilize exclusively a pneumatic system for unloading its cargo of cement.

Owned and operated by Ponce Products, Inc., of Miami, Fla., the *S. S. Florida State* is in service transporting cement from the Ponce Cement Corporation's mill at Ponce, Puerto Rico, to the company's new storage and shipping installation at Port Everglades on the southeast Florida coast.

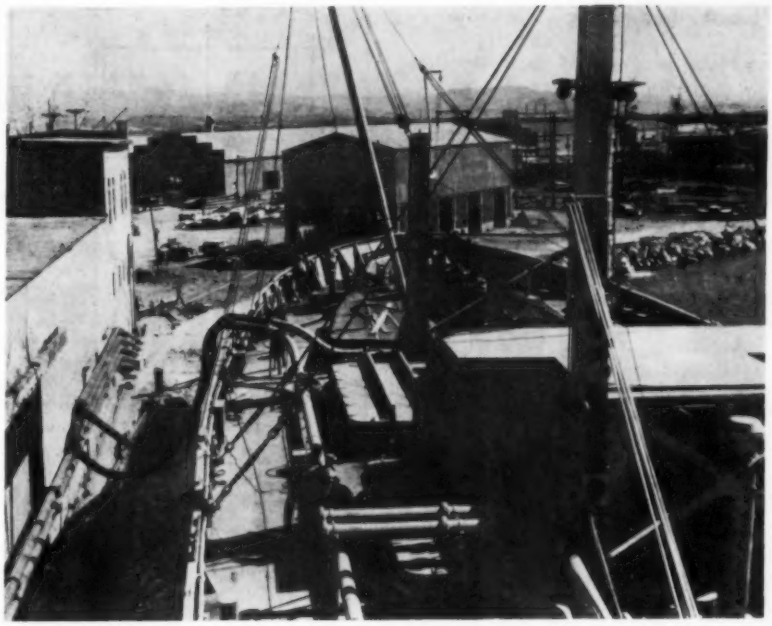
Formerly the Liberty ship *P. W. Sprague*, the vessel was converted for use as a bulk cement carrier by the Todd Shipyards Corporation, based on a design by Theodore E. Ferris & Sons, naval architects. All unloading equipment incorporated in that project, as well as that for cement handling at the docks in Ponce and Port Everglades, was designed, engineered, and fabricated by the Fuller Company. Equipment on the ship has the capacity to remove the full cargo of approximately 9,000 gross tons (55,000 bbl.) from all hold compartments and pump it ashore in 16 hours. The same capacity is available in the Ponce dock loading facilities.

At the latter installation, trucks from the mill dump into four hoppers. Below each is a pump which transfers the cement through 6-in. lines directly to the ship. On the ship, the material is handled by four conveying systems comprised of 10-in. type H Fuller-Kinyon pumps and 2,766-c.f.m. companion compressors. Each system has a capacity of 1,000 bbl. per hour.

Heavy-duty flexible sections connect the dock supply lines with the ship's 10-in. fill pipes that feed the port and starboard sides of eight hold compartments — four forward and four aft. Each compartment is divided into two sections by a central longitudinal bulkhead, and each is loaded independently of the adjoining section.

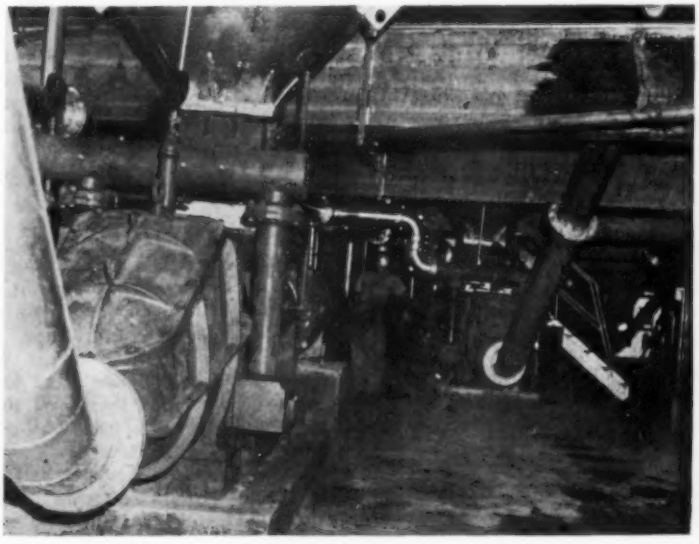
At Port Everglades the ship's own unloading equipment transfers the cargo to the shore facility. The bottom of each cement compartment is

(*Continued on page* 100)

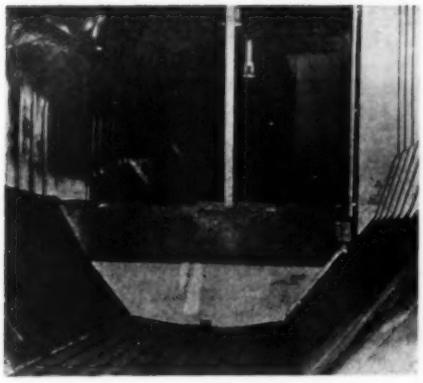


Formerly a Liberty ship and converted for use as a bulk cement carrier, the "S.S. Florida State" is shown here at the Ponce Cement Corporation's dock at Ponce, Puerto Rico. Fill and distribution pipes seen on the deck supply the port and starboard sections of eight hold compartments.

At the Ponce, P.R., dock facility, four pumps transfer the material from individual hoppers through 6-in. lines to the "Floride State's" fill and distribution pipes.



The bottom of each hold compartment is made up of an open-type, air-activated conveying system (lower center). This moves the bulk cement to a pump hopper, from which the ship's own pumps transfer the material ashore through discharge lines in self-unloading.



N.L.A. Meeting

(*From page* 66.)

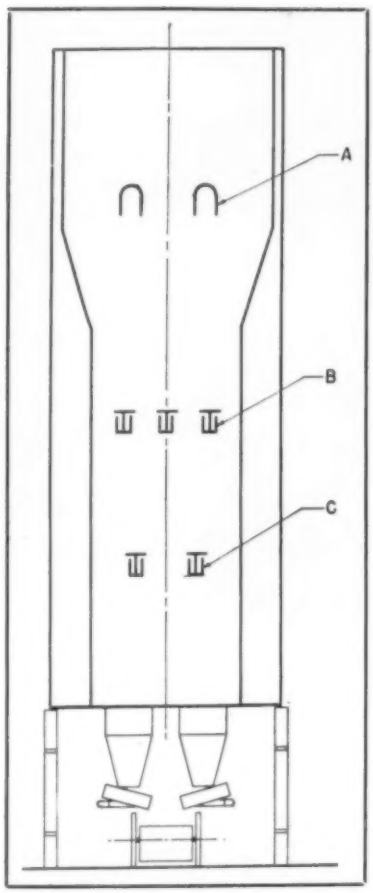
scientific progress of man through the centuries. Using speed as an illustration of our progress, he showed that it was only in 1830 that man broke through the "oat barrier," or was able to achieve speeds beyond that of a running horse. He showed how progress developed more and more rapidly in the last few years, passing the sound barrier, and that it is now shooting upward in an almost vertical curve.

According to Mr. Powell, this rapid advance in all fields has created a highly complex economy, both civilian and military. This has made the necessary task of being prepared for another war a very difficult one, requiring full co-operation from all sectors of our economy. Also, we will not have three years in which to get ready, as we did in the last war, and we must not make the mistakes we made the last time. He was referring particularly to the mistakes and delays in the production of war material, much of which had to come from plants converted from manufacture of peacetime needs.

The industry mobilization plan with which Mr. Powell is connected is designed to locate the best sources of military production, develop practical production schedules, and reserve production capacity to meet these schedules in the event of war. Under this program, when a military agency has a mobilization requirement for an item, it first makes a list of manufacturers believed to be best suited to produce these items in the quantities needed. If it is not already registered for another product, a joint plan is developed with plant officials to make the best possible wartime use of their operation. A production schedule is then developed which can go into full effect with the least delay.

This plan will have many advantages in addition to the direct military one of making needed materials available more rapidly. It will also mean continuity of operations for the plant and continuity of employment for the workers. It will also mean that we will not have to purchase and store huge and expensive war reserves of military items which might never be used.

Water Treatment A discussion of some of the lesser-known uses of lime in water treatment was presented by Merrill Riehl, superintendent of water purification, Mahoning Valley Sanitary District, Youngstown, Ohio. Work is continuing on the seventh edition of the N.L.A. book on water treatment.



Elevation showing the general design and modifications made in the high-capacity vertical lime kilns at the Ashtabula, Ohio, plant of the Electro Metallurgical Company.

High-Capacity Vertical Kilns A feature of the program was the paper on *High-Capacity Vertical Lime Kilns* by H. DeWet Erasmus and H. Leuenberger of the Electro Metallurgical Co., which we present in full. The paper was read by Mr. Leuenberger and was illustrated with slides and movies.

"Electro Metallurgical Company has been a lime user since 1896, when it was founded to make calcium carbide at Niagara Falls. When in 1902 the company's new intallation at Sault Ste. Marie, Mich., began to make carbide, a number of small shaft kilns were included in the facilities to supply the lime needed there. These quasi-continuous kilns were later replaced by rotaries. At the Niagara Falls works, the first rotary kiln was installed in 1907.

"In 1946 it was decided to build vertical kilns at the Ashtabula plant of Electro Metallurgical Company, to supply lime for the calcium carbide furnaces. The reason for this decision was the growing need for air pollution abatement. In the plants with rotary kilns, the emitted dust had become a serious problem of community relations, and efficient and economical collection methods were not too well established at that time. The much less dusty vertical kilns offered an obvious means of avoiding complications of this kind.

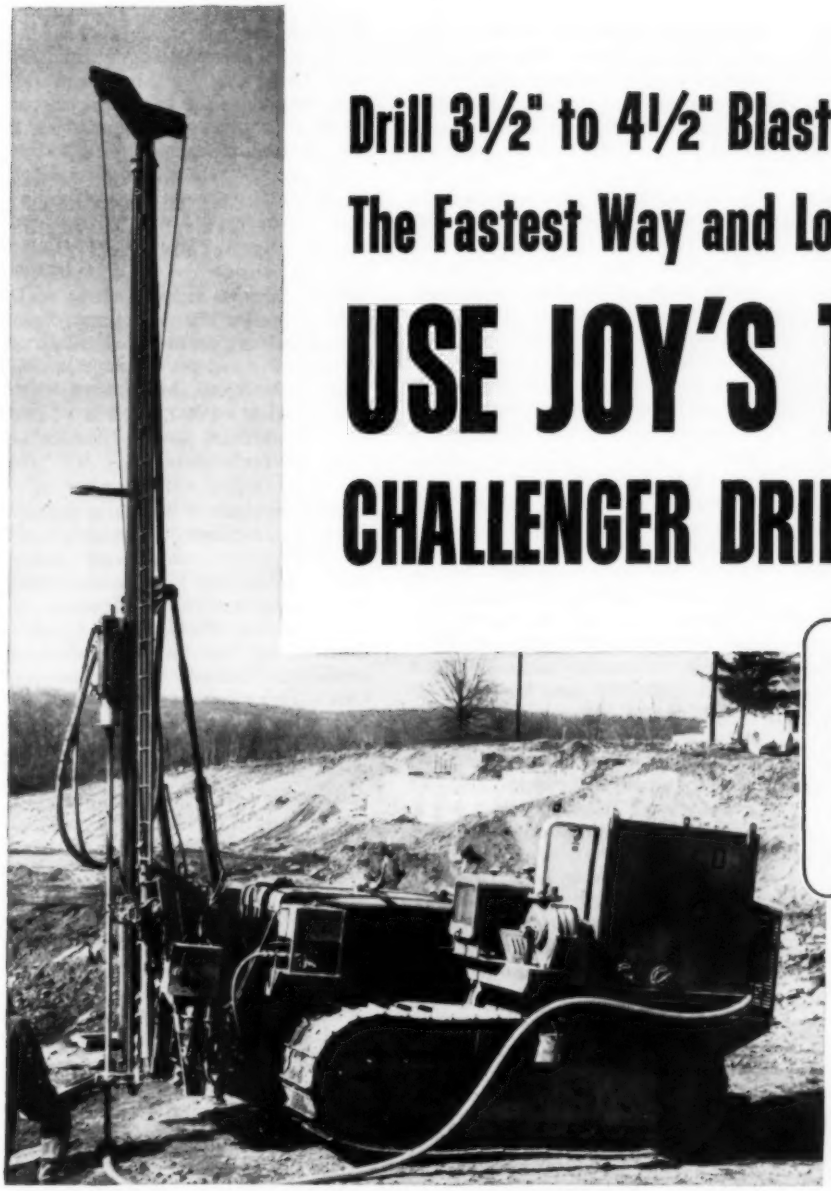
"The Ashtabula plant was consequently equipped with three shaft kilns to meet the lime requirements at that time. A commercial design of 100 tons per kiln per day was purchased. The kilns were to operate with induced draft, using producer gas as a fuel. The dimensions were 11 by 11 ft. internal cross section in the calcining zone and 50 ft. shell height. A 3¼- by 2-in. Michigan limestone, rescreened over ¾-in. to remove fines produced in transit and storage, was to be calcined.

"The operation of the kilns according to design was unsuccessful, to say the least. Heat distribution across the 121-sq. ft. cross section proved an unsolvable problem with producer gas. Hanging was severe, and so was refractory damage. Efficient barring to break incipient hangs, if they could be detected at all, was practically impossible due to the width of the burden (11 by 11 ft.). Consequently, lime quality was poor, and production costs were exorbitant.

"After a frustrating struggle of several years, it had become clear that tight control of heat input and fuel distribution across the kilns was an absolute necessity, if complete failure were to be avoided, and that fast vertical movement of solids was needed to counteract hanging. This, of course, implies highest practical throughput.

"Step by step, the outlined concepts were put into practice. To permit high operating rates, the induced draft had to be increased. It progressively rose from 6 in. to 28 in. water gauge. The specific lime production rate went up correspondingly from 1 to 4 tons per day per square foot of kiln cross section. To prevent stone from being sucked out of the kiln, the off-take pipes for exhaust gas were changed into inverted tall channels with suction at both ends, as indicated at 'A' in the accompanying sketch.

"To achieve accurate heat distribution, a radical departure from established practices was necessary.



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All refractory ducts that had been tried for fuel distribution had failed. It was, therefore, decided to try water-cooled steel ducts. Calculations indicated that the heat transfer rates to such water-cooled structures would be within acceptable limits. The heat loss calculations were checked by inserting a short water-cooled duct section into an operating kiln and measuring heat transfer rates. This duct section also permitted a study of the flames resulting from the injection of fluid fuels from it into the kiln. The tests bore out the calculations and proved the feasibility of the proposed design. It was, therefore, decided to proceed with a full-scale installation.

"The ducts were designed as hollow, water-cooled beams traversing the kiln in a free span. They were made strong enough to support a large part of the kiln charge, and to resist failure in case of a temporary interruption of the cooling water flow. By longitudinal and transversal partitioning of the boxlike beams, each was divided into four equal ducts. For each of these a number of ports into the kiln were provided. Cold air, and/or cool clean products of combustion could be introduced into the kiln from these outlets. Fuel pipelines were installed inside the ducts to discharge fuel at the desired rate into the center of the aforesaid ports. Because all connections were made removable, the duct structures could be readily slid through the kiln.

"A particularly useful feature provided by the end-supported ducts is, that the downward flowing lime forms a V-shaped channel under them, which can be viewed through sight glasses. The burden is thus clearly visible across the kiln, and it can be checked for temperature distribution and for hangs.

"The burner ducts were installed in the kiln at two levels, as shown at 'B' and 'C' (see sketch), to permit control of flame temperatures with minimum detraction from heat evolution above the commercial calcining level of about 1000 deg. C.

"The modified kiln operates as follows: To improve the thermal efficiency of the kiln, sufficient combustion air is sucked up through the burden to cool the descending lime. About half of the total air requirements are needed to recover the sensible heat in this manner. By judiciously apportioning the balance of the combustion air and cool clean recirculated exhaust gas to the burner ducts, the desired control of heat distribution and flame temperatures is obtained. Consequently, fusion of lime and thus hanging of the burden becomes infrequent. Moreover, refractory wear is very nominal.

"Some tendency to hang, however, still exists. The non-moving surfaces of the ridge of lime lying on the water-cooled burner ducts, particularly on the lower ones, can get hot enough to bind lime from the passing burden. Hence, it is advisable to stoke the kiln at regular intervals, to break any such accretions. This is done with swivel-mounted mechanical stokers, positioned above the lower burner level.

"Mechanization and automatic controls have reduced the labor requirements per ton of vertical kiln lime to the level of a comparable rotary kiln installation.

"It was stated above that for satisfactory operation of the kilns the fuel should be carefully distributed. This means that each fuel stream going into the burner structures should be metered. In the beginning, sufficiently clean gas was not available to permit metering, and fuel oil had to be used for a considerable time. The average fuel consumption for this period was 31 gal. per ton of lime. At present by-product gas, consisting predominantly of carbon monoxide from electrothermic smelting operations, is used. Natural gas is often admixed to the carbon monoxide to even out the fluctuations which always accompany smelting operations.

"The tabulation below gives typical operating data of the modified kiln design. The production levels cover the range from intermediate to what we call high throughput. The figures refer to 30-day periods burning 3¼- by 2-in. Michigan limestone rescreened over ¾-in., and using gas from smelting operations with a calorific value of 230-270 B.t.u./standard cubic foot.

"Lime of the quality shown is entirely satisfactory for smelting operations and also for many chemical applications. It has, for example, successfully been used for causticizing to recover ammonia from its salts.

"By increasing the draft and by carefully distributing the fluid fuel through water-cooled steel ducts, an utterly unsatisfactory shaft kiln designed for 100 tons of lime per day was converted into a highly efficient production unit yielding up to 480 t.p.d. from 3¼- by 2-in. limestone. This high-capacity kiln represents a minimum capital investment to meet a given lime production rate."

In the ensuing discussion it was brought out that the maximum calcium oxide in the product was 93 percent, that at full capacity a 385-hp. fan is required, and that the stokers cover 80 percent of the total cross-section. The discharge gas ranges in temperature from 480 to 520 deg. F., and the product can be held in the hand. Mr. Leuenberger also said that a 100-t.p.h. kiln of this design would be just as efficient as these 480-t.p.h. units.

New Circular-Hearth Calciner The first publicity given a new and very promising type of lime kiln was included in a paper entitled *Calcimatic—A New Calciner With Built-in Quality Control*, by Ian Smellie, industrial consultant, Calcimatic Co., Toronto, Ont. This kiln can burn from dust up to one-man size stone, and the pilot plant installation has been in operation for about a year.

The original idea for "Calcimatic" was conceived by H. L. Hall, a Canadian industrialist, who had been searching for a kiln which would burn any size of stone, use any available fuel, and give a consistently top quality product with no waste.

With this kiln under carefully controlled temperature and time conditions, thin beds of stone of various sizes can be processed on a refractory hearth, with consistently good results, and it can be done at a rate of speed which would make a production sized unit economically reasonable.

Because the process is continuous, the hearth is circular and is caused to revolve at any desired speed. Over the hearth are several combustion chambers, separated from each other by baffles extending downwards almost to the top of the moving ribbon of stone. Each of these chambers may be fired through the walls and/or roof, with various types of burner equipment. Each chamber or zone is separately controlled by its own instruments, and will, therefore,

Lime Production Rate Tons/Day	Average Core % $CaCO_3$	Maximum Core % $CaCO_3$	Minimum Core % $CaCO_3$	Specific Energy Consumption 10^6 B.t.u./ton of Lime	Kiln Draft in. H_2O
327	3.5	8.6	0.2	4.2	13
344	3.2	7.5	0.6	4.1	14.5
371	3.6	9.5	1.4	4.1	18
480	5.6	10.2	2.1	4.9	28

hold a pre-set temperature to plus or minus a few degrees.

The feeder where the stone is put on the hearth is adjustable, so that there may be any desired depth of bed on the hearth; and as the material is transported through the process, it does not move in relation to itself or to the refractory with which it is in contact.

With this equipment the thickness of bed, the time of travel, and the exact temperature conditions can be controlled. If a material which can be damaged by excessive heat is to be processed, the temperature control instruments can be set so that it is never subjected to such heat in any zone.

In most of the other types of equipment on the market today, said Mr. Smellie, the condition of highest heat is towards the discharge end of the process, where most of the material is in the form of lime, and at which point most damage can be done by excessive heat. In the case of "Calcimatic," the finishing zone temperature can be controlled to exactly what is wanted, and larger temperature heads can be applied earlier in the process with safety.

While the stone passes in one direction, all the products of combustion from the various zones go in the opposite direction under the various baffles, and thus the equipment has all the advantages in efficiency to be gained from true counter-flow.

According to Mr. Smellie, the first and one of the most important features of "Calcimatic" is the quality of the finished product. Because of exact control over the variables of time and temperature, and the point of application of that temperature, a product can be made consistently in which the available lime is as high as the raw material will permit. This equipment can produce lime with pre-determined chemical and physical attributes, once again up to the limits of the raw material, and it is infinitely variable to the following factors (which are usually fixed within narrow limits in other types of equipment): stone size, stone quality, fuel, and production rate.

It was stated that uniform quality can be achieved on any size of stone or even on mixtures of sizes. However, from practical considerations, it appears preferable to charge a uniform size of stone between a bottom of ¼-in. and a top of 4 in.

In the "Calcimatic" the stone is transported in a relatively thin layer through the process. Since the zones of temperature through which the stones pass is accurately controllable, said Mr. Smellie, the thermal requirements of the stones can be anticipated and met with a consequent reduction in attrition, due to thermal shock.

Almost any gaseous, liquid, or solid fuel can be used, and the unit can be set up, if desired, so that it can be quickly switched from one fuel to another. The production rate is infinitely variable, from nothing up to the rated capacity of the equipment.

The efficiency of a lime-burning operation, said the speaker, is frequently assessed by the number of B.t.u.'s consumed in the calciner per ton of product made. As a yardstick of efficiency, this method of interpreting fuel efficiency leaves much to be desired. The only true test of efficiency, it was noted, is the overall cost of getting a ton of limestone from the quarry into salable lime in a bin. This includes the cost of quarrying, transporting, crushing, screening, conveying, storage, charging, burning, grading, and all capital costs and maintenance.

Since "Calcimatic" was described as making a product that is all lime, with no waste, less raw material is required; and consequently all the services described should be smaller and, in the case of grading, eliminated. The unit can be completely automated, and as far as the equipment is concerned, operation could be handled by one man.

The basic unit will produce top quality lime at around 9,000,000 B.t.u.'s per ton it was said. The addition of heat recovery equipment will reduce this figure down to 6,000,000 B.t.u.'s per ton, Mr. Smellie noted, and added that this should be examined on its merits for each plant and fuel.

Controllability was singled out as the most significant feature in the success of the equipment. The operator has at his finger tips the following abilities: speed control—covering the exact length of time that each stone is exposed to the heat; temperature control—to establish the exact temperature of each zone through which the stone passes; product quality control—in which each stone is given the calcination conditions required for a given product; and load control—with which the load of stone per square foot of hearth and hence production rate can be varied as desired. This is significant, the speaker pointed out, when changing from, for example, a supply of ¾-in. stone to a supply of 2-in. stone.

Among other points, automatic loading and unloading was emphasized. Also described as an important feature of "Calcimatic" is the fact that it can be shut down or started up in a mattr of hours, with no loss of product or product quality, and no waste.

The "Calcimatic" can be built in any size from 10 t.p.d. to 500 t.p.d., Mr. Smellie stated. Larger units could be built, he added, but economic and plant operating characteristics would probably dictate multiple units above this level. Large units will operate more efficiently than small ones.

The cost of building "Calcimatic" units, it was said, would vary from $2,500 per ton of lime produced per day up to $3,000 per ton, depending on the amount of heat recovery equipment required and the size of the unit. The larger sizes cost less to build per ton of production than the small ones.

Since the walls and roof of "Calcimatic" are not in contact with the products, they are expected to have a life of many years. While the hearth is built of hard refractory or castable, there is no abrasion, and consequently replacement should be infrequent. Maintenance of standard equipment such as fans, motors, and driving mechanisms, was described as comparable to normal plant practice, except that in the case of "Calcimatic" all the equipment is at ground level, and is easily accessible.

In closing, Mr. Smellie especially acknowledged the aid and advice provided by Paul Sunderland, chairman of the board, A. K. Frolich, chief engineer, and Ed Baxter, superintendent of the Galloway plant of the Ash Grove Lime & Portland Cement Co.

The original test work was carried out and the first prototype "Calcimatic" was built at the Galloway plant, where the use of all plant facilities, including the laboratory for the testing of product quality, was made available. During this period several lime companies furnished samples of their stone, in order that it might be established whether or not there was a marked difference in production rate from one type of stone to another. The speaker stated that this difference was very small.

It was pointed out that the prototype unit has been in successful operation for nearly a year.

In an ensuing discussion it developed that only about 1½ in. of suction was required to operate this kiln. The very largest kiln would require only about 10 hp.; the pilot plant uses only ¼ hp.

Extensive Talc Deposits Supply Utah, Montana Plants

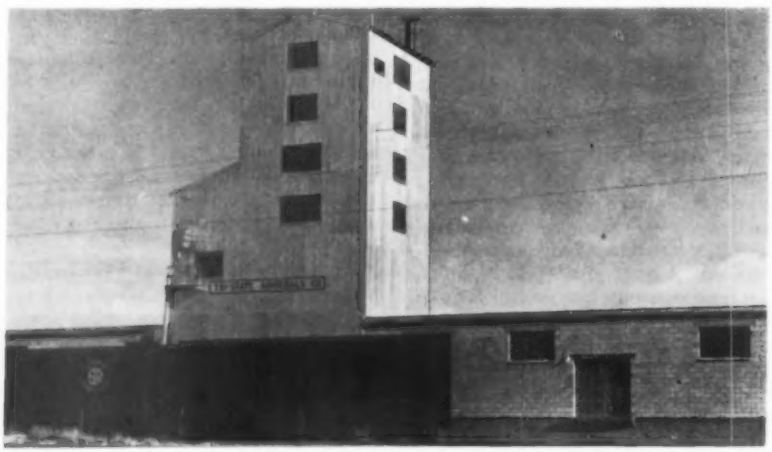
Southern California Minerals Makes Finest Known Talc Sizes

By HARRY F. UTLEY

SOUTHERN California Minerals Company, along with its affiliate, the Tri-State Minerals Company, is one of the country's leading producers and processors of talc. A pace-setter in the industry, technologically and marketwise, the company has its headquarters in Los Angeles, where it grinds and packages talcs and clays for the trade. Two Raymond mills process the materials in the Los Angeles plant; the first was installed in 1936, and the second in 1951.

The firm's talc reserves are the largest in the country, according to Walter K. Skeoch, owner. Holdings include 10 or 11 mines in California's Death Valley area, plus vast deposits acquired since 1942 near Dillon, in southwestern Montana. The Montana holdings consist mainly of the highest grade of steatite talc. The deposits in California are underground mines to a large extent, whereas the Montana properties are being worked as open quarries.

In addition to the original processing plant in Los Angeles, Mr. Skeoch operates a modern grinding plant in Ogden, Utah, where extremely fine sizes are produced by fluid-energy milling. This milling method, inaugurated in 1953, employs superheated steam to yield the smallest known micron sizes of talc.



This new talc processing plant at Barratts, Mont., went into operation in January, 1956.

Operations In Montana Latest of the firm's achievements is the erection of a new grinding plant at Barratts, Mont., which began operations in January, 1956. Housed in a 50 by 200 ft. concrete masonry structure, the Barratts plant is equipped with a Raymond roller mill, capable of producing 40 to 50 carloads of ground talc per month. The Barratts plant is located on the Union Pacific Railroad, about 8 miles south of Dillon, where the concern has washed and beneficiated talc for several years. (The Montana mines all lie within a 30-mi. radius of Barratts.)

The 50-in. 5-roll Raymond mill at Barratts is all-electric, even to its heating and drying functions. To an extent, low winter temperatures in that area dictated the choice of electricity, since preheating and activating of fuel oil, plus the year-round maintenance of a boiler could be

At the Ogden, Utah, plant low micron sizes of talc are produced.

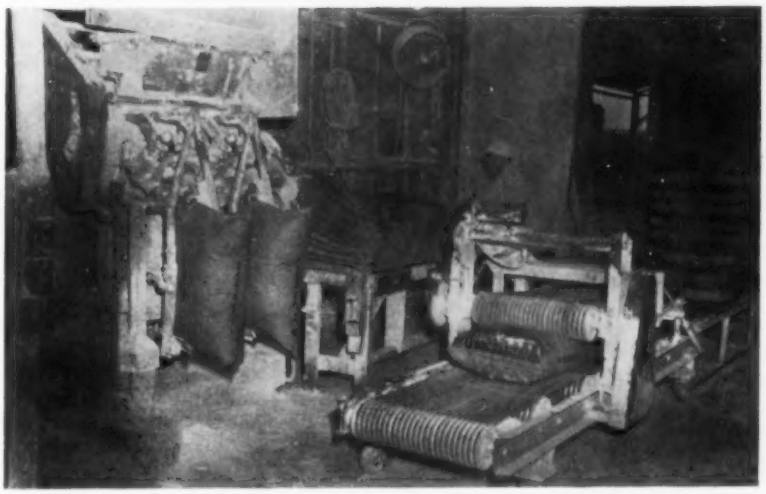
costly. Large stockpiles of mine-run talc are maintained at Barratts, particularly in the winter, to insure a supply of crude adequate for any processing demand.

Operations In Utah The Ogden plant receives its ore in boxcars from deposits in California and Montana. The California product, which arrives as mine-run, is reduced to minus ¾-in. by a Kue-Ken 14- by 20-in. jaw crusher before it is sent to bin storage. The Montana talc is crushed at Barratts before shipment, and requires no further crushing at Ogden before it is binned.

From the 50-ton storage and feed bin, the talc is carried by a Raymond pneumatic feeder to a 42-in. gas-fired 3-roll Raymond high-side mill, equipped with whizzers for closed-circuit grinding. The product of this mill is bagged for shipment, subjected to further grinding to low-micron sizes in a 35-in. high-speed, water-jacketed vertical Raymond mill, or pulverized to microscopic size in a Kidwell fluid-energy mill, to gain the finest possible end product (6 plus on the Hegerman scale).

The Kidwell mill, installed in 1953, has no moving parts. The feed enters the O-shaped tubular shell *via* an injector (jets) at the bottom. It then encounters a current of dry,

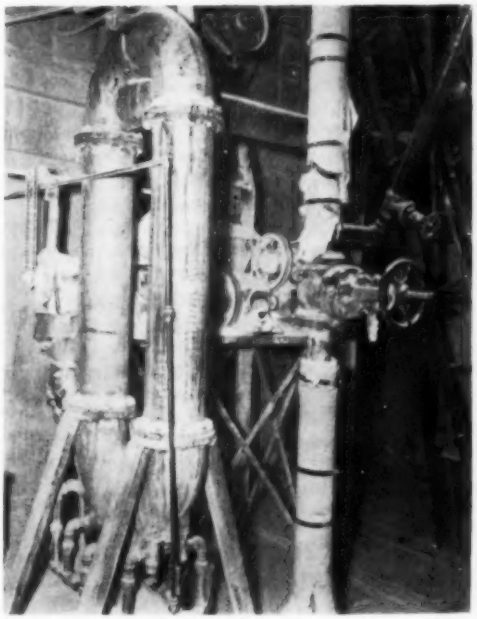
(*Continued on page* 120)



One of the valve packers (left) and the bag-flattening conveyor in the Ogden plant.

Left: The first pulverizing operation at Ogden is done by this 3-roll high-side mill.

Right: The smallest known micron sizes of talc are yielded by this fluid-energy mill. Super-heated steam traveling at high velocity around the O-shaped tube breaks the particles by impact.



Washington News

(*From page* 12)

Americans traveling abroad. Foreign travel is among those consumer expenditures which has shown and exceptionally large expansion in the post-war period. More than twice as much money was spent in 1956 on foreign travel by Americans than in 1947. The dollar income of foreign countries of $1,500,000,000 from American travelers represents a larger sum than the amount spent abroad for coffee or petroleum, our two largest import items.

The following data about travel to Europe and the Mediterranean area may be of special interest. In 1955 some 482,000 American travelers went to Europe and the Mediterranean area; by 1956 the number had increased to 521,000. Approximately two-fifths of these travelers went by sea, and the remaining three-fifths went by air. On the average, plane travelers stayed abroad a much shorter time than those using ships. In 1956 the average length of stay of plane travelers in Europe was 43 days, while ship travelers stayed 71 days.

The recent growth of overseas travel therefore reflects an expansion of the market to persons who have less time at their disposal or less money to spend. Because of the shorter time spent abroad by plane travelers, their average expenditures are considerably smaller than those of persons traveling by ship, although for each day abroad plane travelers spend more money. Sea travelers spent about $21 a day in 1956, while air travelers spent close to $24 a day.

The Commerce Department's report reveals a great deal about the seasons of the year in which it is best to travel in Europe. Out of the 521,000 American travelers in Europe in 1956, more than two-fifths of them, or 211,000 were there in the summer months of July, August, and September; an additional 161,000 U. S. travelers were abroad in the second quarter of the year, the months of April, May, and June. Clearly, these were the crowded times, and the data on travel expenditures indicate that they were the most expensive times since the average travel expenditure exceeded $900 per person during this period. The next most crowded period was the fourth quarter of the year, and the least crowded period was the first quarter.

Travelers in the first quarter not only found conditions less crowded, and probably obtained better accommodations; they also spent less money, less than $750 per person. From present indications, junketing congressmen may not be able to get away much before the third quarter of this year or the first quarter of 1958. For whatever consolation it may be, this is the least expensive time to travel abroad, and will, no doubt, be pointed to as another effort to save the taxpayers' money.

Labor Developments

(*From page* 54)

The situation in this case was that the company and the union entered into a collective bargaining agreement which provided that there would be no strikes or work stoppages and that grievances would be handled pursuant to a specified procedure, the last step of which was final and binding arbitration. Several grievances arose concerning work loads and work assignments. They were processed through the various steps of the grievance procedure during which the union's request was denied by the employer. The union requested arbitration, and the employer refused. The question before the court was whether it could order the employer to arbitrate the cases.

The lower courts went up and back on the issue, but the Supreme Court seemed to have no trouble. It ruled that such arbitration clauses in labor agreements can be enforced in federal courts under the Taft-Hartley Act. That act includes the provision that "suits for violation of contract between an employer and a labor organization representing employees in an industry affecting commerce . . . or between any such labor organizations, may be brought in any District Court of the United States having jurisdiction of the parties, without respect to the amount in controversy or without regard to the citizenship of the parties." Since this was a violation of a contract, the Supreme Court did not doubt that the federal courts could require its observance.

The court anticipated the next problem: namely, whether compelling the arbitration of grievance disputes by use of the injunction would violate the anti-injunction provisions of the Norris-LaGuardia Act, and it ruled in advance that the provisions in that act were not deterrent.

This decision raises a variety of questions about the enforceability of labor contracts. It now appears that almost any provision of any contract of any employer in inter-state commerce (and therefore covered by the Taft-Hartley Act) may come before the federal court for interpretation and enforcement. This makes it all the more important that labor agreements be drafted carefully, so that they will clearly reflect the intent of the parties. Too frequently such agreements are treated less seriously than they warrant. Many matters requiring change are neglected year after year because, temporarily, they are not too troublesome, so long as they are not enforced too rigorously. However, should either party care to enforce them, they could, on the basis of this decision, probably get the help of the federal court in obtaining such enforcement.

A careful reading of this case, in which history was made, suggests that the company was not at all sure when it agreed to arbitration that questions such as work assignments and work loads, traditionally entirely within the province of management, would ever go to arbitration. This was probably an undetermined area in which no real meeting of the minds had ever occurred. On the basis of the contract language, however, the company was clearly in violation, and the full force of the Federal Government was brought to bear against it.

CHARLES H. NOBLE JR., formerly treasurer of the Hercules Cement Corporation, has retired from active service, according to an announcement released by the board of directors.

Two other announcements were made at the same time. LEONARD P. CONNOLLY was elected treasurer, and GEORGE M. HARBISON was named controller.

GORDON G. HALVORSEN, Cleveland district sales manager of the Dicalite Division of Great Lakes Carbon Corporation, Ohio, has been promoted to assistant general sales manager of the Mining and Mineral Products Division.

GARNER A. BECKETT, president and director of the Riverside Cement Company, San Francisco, Calif., was honored recently at a testimonial dinner of the National Conference of Christians and Jews. Mr. Beckett received a National Honor Award Bronze Plaque for his contributions to the advancement of good inter-faith relations.

Mr. Beckett joined Riverside Cement in 1921, and has served as its president since 1936.

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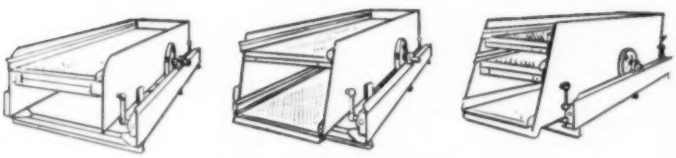

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Production and Value Of Sand and Gravel in 1956

By KENNETH E. TOBIN, JR.

Associate Executive Secretary
National Sand and Gravel Association

THE National Sand and Gravel Association recently completed its fourth annual survey of the production and value of sand and gravel. This survey is designed to fill the need for a current measurment of the contribution which the sand and gravel industry makes each year to the national economy.

Questionnaires were sent to the 1,597 sand and gravel companies in the United States of which we have record. Returns were received from 551 companies, operating 922 plants. In addition to receiving returns from 551 companies, production statistics were also available for 53 member companies which did not return the questionnaire. These statistics have been incorporated in the study wherever possible, making a total participation of 604 companies.

Table 1 shows that the reporting companies produced 239,795,334 tons, valued at $265,225,544, or an average of $1.10 per ton. Accurate comparisons with the Bureau of Mines' statistics are not feasible because participation in our survey was not as large, and, further, the Bureau's statistics include government-and-contractor production as well as approximately 20,000,000 tons of industrial sand production which we

TABLE 1—SAND AND GRAVEL IN 1954, 1955 AND 1956

	1954	1955	1956
Production:			
Sand (tons)	84,164,624	95,210,450	104,970,811
Gravel (tons)	102,679,824	110,343,428	134,824,523
Total (tons)	186,844,448	205,553,878	239,795,334
Value:			
Sand	$ 80,995,278	$ 90,053,558	$105,080,012
Gravel	115,348,860	125,002,997	160,145,532
Total	196,344,138	215,056,555	265,225,544
Average value per ton:			
Sand	$ .96	$ .95	$1.00
Gravel	1.12	1.14	1.19
Total	1.05	1.05	1.10
Companies surveyed	1,691	1,657	1,597
Companies reporting	553	565	604
Number of plants operated by reporting companies	878	909	975
Average production per reporting company (tons)	337,874	380,631	397,012
Average production per reporting plant (tons)	212,807	236,586	245,944

TABLE 2—METHODS OF TRANSPORTING SAND AND GRAVEL IN 1955 AND 1956

Type of Transportation	1955 Short Tons	1955 Percent of Total	1956 Short Tons	1956 Percent of Total
Truck	128,782,913	62.7	151,698,995	68.6
Rail	50,133,301	24.4	44,947,044	20.3
Water	18,189,526	8.8	19,825,103	9.0
Unspecified	8,448,138	4.1	4,737,543	2.1
Total	205,553,878	100.0	221,208,685	100.0

TABLE 3—CONSUMPTION OF SAND AND GRAVEL IN 1955 AND 1956

Type of Consumer	1955 Short Tons	1955 Percent of Total	1956 Short Tons	1956 Percent of Total
Construction (buildings, highways, streets, etc.)	86,389,305	42.0	97,018,506	43.9
Ready mixed concrete	65,085,531	31.7	68,493,673	31.0
Concrete products	9,212,874	4.5	9,344,330	4.2
Railroad ballast	4,736,513	2.3	4,538,793	2.0
Sold through dealers	27,266,516	13.3	21,592,023	9.8
Other	5,069,954	2.5	9,495,035	4.3
Unspecified	7,793,185	3.7	10,726,325	4.8
Total	205,553,878	100.0	221,208,685	100.0

TABLE 4—DISTRIBUTION OF 1956 SAND AND GRAVEL PRODUCTION BY SIZE OF COMPANY

Size Group (tons)	No. of Companies	No. of Plants	Production (tons)	Percent of Reported Production	Percent of Participating Companies	Percent of Participating Plants	Accumulated Percents of Totals: Total Production	Total Companies	Total Plants
0 — 25,000	38	40	571,530	0.2	6.3	4.1	0.2	6.3	4.1
25,000 — 50,000	75	78	2,719,675	1.1	12.4	8.0	1.3	18.7	12.1
50,000 — 100,000	97	111	7,195,059	3.0	16.0	11.4	4.3	34.7	23.5
100,000 — 200,000	155	188	22,196,416	9.3	25.7	19.3	13.6	60.4	42.8
200,000 — 300,000	69	91	16,766,344	7.0	11.4	9.3	20.6	71.8	52.1
300,000 — 400,000	36	49	12,269,115	5.1	6.0	5.0	25.7	77.8	57.1
400,000 — 500,000	26	54	11,556,979	4.8	4.3	5.5	30.5	82.1	62.6
500,000 — 600,000	15	26	7,953,731	3.3	2.5	2.7	33.8	84.6	65.3
600,000 — 700,000	12	17	7,733,557	3.2	2.0	1.7	37.0	86.6	67.0
700,000 — 800,000	9	16	6,765,390	2.8	1.5	1.6	39.8	88.1	68.6
800,000 — 900,000	12	38	10,145,621	4.2	2.0	3.9	44.0	90.1	72.5
900,000 — 1,000,000	9	18	8,467,553	3.6	1.5	1.9	47.6	91.6	74.4
1,000,000 — 2,000,000	27	100	38,525,752	16.1	4.5	10.3	63.7	96.1	84.7
2,000,000 — 3,000,000	13	87	30,907,875	12.9	2.1	8.9	76.6	98.2	93.6
3,000,000 — 5,000,000	7	37	26,603,046	11.1	1.1	3.8	87.7	99.3	97.4
Over 5,000,000	4	25	29,417,691	12.3	0.7	2.6	100.0	100.0	100.0
Total	604	975	239,795,334	100.0	100.0	100.0			

This table does include the 53 member companies which did not return our questionnaire, but whose total production of 18,586,649 tons of sand and gravel was otherwise available.

excluded from our survey. Included in Table 1, however, is a comparison with the data developed in our 1955 survey in which 565 companies, operating 909 plants, reported a total production of 205,553,878 tons of sand and gravel, at a value of $215,056,555, or an average value of $1.05 per ton. Also included are comparable statistics from our 1954 survey.

The average production per reporting company was 397,012 tons, compared with an average production per company of 380,631 tons reported for 1955. Average production per plant in 1956 was 245,944 tons as compared with 236,586 tons in 1955. The reporting companies produced 104,970,811 tons of sand, valued at $105,080,012, an average of $1.00 per ton, and 134,824,523 tons of gravel, valued at $160,145,532, an average value of $1.19 per ton.

The totals reported in Table 1 include data from 53 member companies which did not return our questionnaire, but whose production figures were otherwise available. The total sand and gravel produced by these companies in 1956 was 18,586,649 tons. Therefore, the total commercial production for which we can account in 1956 was 239,795,334 tons.

Table 2 is an analysis of the methods of transportation employed by the sand and gravel industry for shipping its product in 1956. Included for purposes of comparison are data from our 1955 survey. Trucks continue to carry an ever-increasing majority of sand and gravel tonnage, accounting for 151,698,995 tons, or 68.6 percent of the reported production as compared with 62.7 percent of the production reported in our 1955 survey. Railroads transported 44,947,044 tons, or 20.3 percent of the total production. This was a slight decrease from the 24.4 percent shipped by rail in 1955. Water transportation accounted for 19,825,103 tons of sand and gravel, or 9.0 percent of the reported production. This was an increase of 0.2 percent from the 8.8 percent of the total production transported by water in 1955.

Table 3 summarizes the consumption of sand and gravel in 1956. The heavy construction industry (industrial buildings, highways, streets, etc.) consumed 97,018,506 tons, or 43.9 percent of the reported total. This represents a slight increase in the percentage of consumption by heavy construction as reported in 1955. The ready mixed concerte industry was the second largest purchaser of sand and gravel, using 68,493,673 tons, or 31 percent of the reported production. This is approximately the same percentage consumption by ready mixed concrete as was reported 1955.

Sizable quantities of sand and gravel were also used for concrete products and railroad ballast. Almost 10 percent of the total production was sold through dealers, and the ultimate consumer is not identified for that tonnage.

Table 4 is an analysis of the distribution of sand and gravel production in 1956 by size of company, based on returns from our 551 reporters plus the 53 member companies whose statistics were otherwise available, for a total of 604. The largest number of companies are in two brackets: 50,000-100,000 tons, in which there are 97 companies, representing 3.0 percent of the total production; 100,000-200,000 tons, in which there are 155 companies, representing 9.3 percent of the total production.

Eleven companies reported individual production of more than 3,000,000 tons of sand and gravel last year, accounting for 23.4 percent of the total production. It is interesting to note that the 75 percent of companies representing the smaller three-fourths produced less than 25 percent of the total tonnage.

For the first time in this annual survey, data was prepared on electric motor horsepower capacity in the sand and gravel industry. The additional information, which was prepared in response to several requests from within the industry, showed the following: 395 companies reporting on 686 plants had an installed horsepower capacity of 337,266 or an average of 492 per plant. With a total production of 176,543,116 tons reported from these operations, an average of 1.91 hp. per 1,000 tons produced was installed.

For the second year of this report, other tables (not reproduced here) present the production, value, transportation, and consumption data on a state basis.

At a recent meeting of the board of directors of the Acme Limestone Company, Fort Spring, W. Va., the following officers were elected: Frank Prince, chairman of the board; J. A. Riggs, president; A. W. McThenia, vice-president and general manager; E. R. Alderson, secretary; W. H. Ruby, chief engineer and traffic manager; and Charles F. Smith, manager of sales and traffic.

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RITEX MAGNESITE BRICK — a patented, chemically bonded basic brick for lining the burning zone of rotary cement, dolomite and magnesite burning kilns subjected to service too severe for high alumina brick linings. RITEX also has applications in many vertical (shaft) limeburning kilns.

STEELKLAD BRICK—a RITEX basic brick with steel plates already attached. It may provide major savings in your operation.

HIGH ALUMINA BRICK—These come in a full line of shapes and sizes. ARCO-70 (70% Alumina) is most generally recommended, though brick ranging from 50% to 85% Alumina can also be furnished.

As part of our complete refractories service, we have developed cements, mortars, plastics and castables for the service conditions which have proved long-lasting and economical. They meet all the varying requirements of dry or wet application and cold or hot sets. Delivered in cans or bags of various weights.

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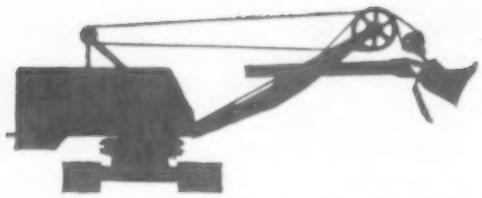

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

NEWEST MODEL KRAFTPACKER automatic open mouth bag filling machine, which accommodates weights from 25 to 200 lb., is described in a new brochure released by the *Kraft Bag Corporation.* (1)

A CONVEYOR SLIDE CHART, offered by *The Fairfield Engineering Company,* indicates capacity and horsepower data for materials of various weights, as well as recommendations for normal and maximum operating speeds and limitations of the sizes of materials to be handled. (2)

ADVANTAGES OF LPG are outlined in a pamphlet entitled *How Truck Operators Save Money and Increase Power With LPG,* available from *Scott-Hall Incorporated.* (3)

KENNAMETAL GRINDING BALLS, manufactured by *Kennametal, Inc.,* are the topic of a folder which includes a discussion of features, test results, and the nature of Kennametal. (4)

THE WARNER ELECTRIC BRAKE SYSTEM is detailed in a 14-page color brochure offered by the *Warner Electric Brake & Clutch Company.* The brochure includes an explanation of the brake operating principle, wiring diagrams, and a description of the system components. (5)

HOW THE LOGAN ARIDIFIER prevents damage caused by contamination present in air that comes from compressors is the subject of a new catalog offered by the *Aridifier Division, Logan Engineering Company.* (6)

SIGNALKORE WIRE ROPE, manufactured by the *Wire Rope Division, American Chain & Cable Company,* is described in Bulletin DH-91, which contains construction details, diameters, weights, maximum lengths, and other general information. (7)

SPENCER PRILLED AMMONIUM NITRATE for blasting requirements is discussed in a booklet released by the *Spencer Chemical Company.* Case histories of mines using the product in their blasting program are cited. (8)

REX PRODUCTS designed for modern cement mill centrifugal discharge elevator service—steel chains, sprockets, buckets, gravity take-ups, bearings, and drag chains—are described in *Chain Belt Company's* new bulletin. (9)

THE MOVING FORCE OF INDUSTRY, a booklet prepared by the *Reliance Electric and Engineering Company,* describes the firm's line of a.c. and d.c. motors, gearmotors, motor-generator sets, motor controls, and complete packaged mechanical and electronic adjustable-speed drives. (10)

BELT-CONVEYED, DRY MATERIAL can be accurately, automatically, and continuously totalized and fed by the modified *Conveyoflo* meter described in a bulletin issued by *Builders-Providence, Inc., division of B-I-F Industries, Inc.* (11)

BULLETIN 70, a publication of *The Flexaust Company,* contains complete information on the *Flexaust* hose and *Portovent* duct products and accessories for moving air, dust, fumes, and materials via pressure, suction, and gravity. (12)

THE HV CENTRIFUGAL DUST SEPARATOR is detailed in *The Day Company's* Bulletin 576 which contains a discussion of design improvements and applications Air flow resistance, dust recovery curves, temprature and pressure correction formula, and selection charts are included. (13)

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77			

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Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

HOBART ARC WELDING NEWS, a 28-page booklet of interesting photographs and articles on welding from all over the world, is now available from the *Hobart Brothers Company.* Time and money saving applications are featured in articles. **(14)**

GRUENDLER'S SINGLE-PASS CRUSHING PLANT is pictured in Bulletin No. SP-56, offered by the *Gruendler Crusher & Pulverizer Company.* Illustrations, features, and specifications are included. **(15)**

GAR WOOD INDUSTRIES' 75B series of ¾-cu. yd. power excavators is featured in a 24-page catalog now available. Detailed action photographs of power shovels, cranes, draglines, and other optional excavator attachments are included. **(16)**

THE TRACTO-LOADER LINE of front end wheel tractors, manufactured by the *Tractomotive Corporation,* is described in a catalog illustrating and describing each of the five Tracto-Loader models currently in production. **(17)**

TORQUE CONVERTERS of excavators, cranes, and shovels are presented in the first of a new series of Data Sheets issued by *The National Supply Company.* The new data sheet, No. 101, briefly explains 12 features of these single stage torque converters in operating this machinery. **(18)**

PORTABLE CRUSHING UNITS manufactured by the *Gruendler Crusher & Pulverizer Company* are featured in a new bulletin which contains illustrations and specifications. **(19)**

THE MANITOWOC RECUPERATOR for rotary kilns is the topic of an illustrated booklet issued by *Manitowoc Shipbuilding, Inc.* Discussions of cooling with heat recovery, quality and grindability, air quenching, and recuperator design are included. **(20)**

DRILLING HOLES, the 75th anniversary catalog of the *Stardrill-Keystone Company,* covers all the products the firm manufactures and their application. The 164-page catalog includes complete specifications and working data, and performance charts under actual field conditions. **(21)**

GULF CONTRACTORS' GUIDE, rewritten and revised by the *Gulf Oil Corporation,* provides helpful information on equipment maintenance. **(22)**

B. F. GOODRICH TIRE COMPANY has published an illustrated guide book which explains all phases of industrial tire use. In addition to specifications for all types of industrial tires, the book describes the complete *B. F. Goodrich* line in detail. **(23)**

BULLETIN No. 119 describes the complete line of belt conveyor idlers available from *The C. O. Bartlett & Snow Company,* listing the standard sizes, dimensions, and weights, and explaining the construction. **(24)**

CAR PULLERS manufactured by the *Jones Machinery Division, Hewitt-Robins, Inc.,* are described in a 32-page booklet, which contains descriptions of several installations and the various types of car pullers available. **(25)**

A MANUAL OF LABORATORY SAFETY covering accident prevention, first aid, fire prevention, and safety equipment, is offered by *Fisher Scientific Company.* **(26)**

AUGUST, 1957

Please send more information on circled items described in this issue.

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77			

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LOOK FOR THE YELLOW TRIANGLE

Slight Increase Recorded For March Lime Sales Above February Volume

Domestic sales of open-market lime in March (753,615 short tons) increased slightly over the previous month's output, according to reports by producers to the U. S. Bureau of Mines. Increases were noted in all major categories.

The table (right) shows sales by types and major uses.

Plants Erected in 3 States In Celotex Corp. Expansion

The Celotex Corporation, Chicago, Ill., has opened a $3,000,000 acoustical tile manufacturing plant at Pittston, Pa. This facility represents an important part of the company's $22,000,000 expansion program.

A new Celotex products plant near Ft. Dodge, Iowa, is scheduled for completion this summer. A third plant, now under construction at L'Anse on the Upper Peninsula of Michigan, will augment existing Celotex insulating fiberboard plants.

JAMES H. NEELAN has been appointed assistant director, Advertising and Public Relations Division, of the Universal Atlas Cement Company, New York, N.Y., a subsidiary of the United States Steel Corporation. Mr. Neelan succeeds Edwin R. Ivy, who has resigned.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1956-57, by Types and Major Uses, in Short Tons

	February 1957	March 1957	March 1956	January-March 1957	January-March 1956
By types:					
Quicklime	587,285	598,737	630,343	1,826,589	1,871,159
Hydrated lime	138,670	154,878	161,821	419,801	452,385
Total lime[2]	725,955	753,615	792,164	2,246,390	2,323,544
By uses:					
Agricultural:					
Quicklime	1,957	5,449	4,009	8,306	10,784
Hydrated lime	10,184	19,377	15,596	35,479	34,391
Total lime	12,141	24,826	19,605	43,785	45,175
Building:					
Quicklime	10,255	10,879	14,534	31,334	39,634
Hydrated lime	66,447	70,337	78,470	193,326	213,650
Total lime	76,702	81,256	93,004	224,660	253,284
Chemical and other Industrial:					
Quicklime	385,729	384,104	393,085	1,172,866	1,177,620
Hydrated lime	62,039	65,124	67,755	190,996	204,344
Total lime	447,768	449,228	460,840	1,363,862	1,381,964
Refractory (dead-burned dolomite)	189,344	198,305	218,715	614,083	643,121

[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2]Approximately 60 percent of lime produced is high-calcium and 40 percent high-magnesium.

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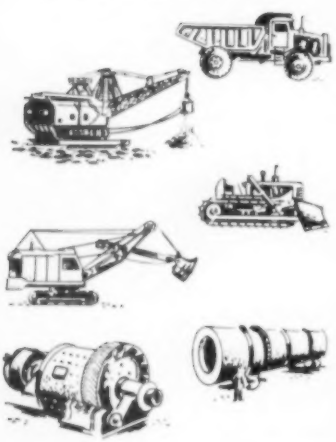
YOUR TOUGH LUBRICATION JOBS



World-famous Whitmore Lubricants succeed where others fail. They are lubricants, not greases. Whitmore's exclusive never-duplicated formulas stop metal-to-metal contact—put wear on the lubricants instead of on costly gears, bearings, and cables. That's why manufacturers of earth, rock, coal, and ore moving and processing equipment recommend Whitmore Lubricants to give you the service they built into your equipment.

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Cement Handling Expedited

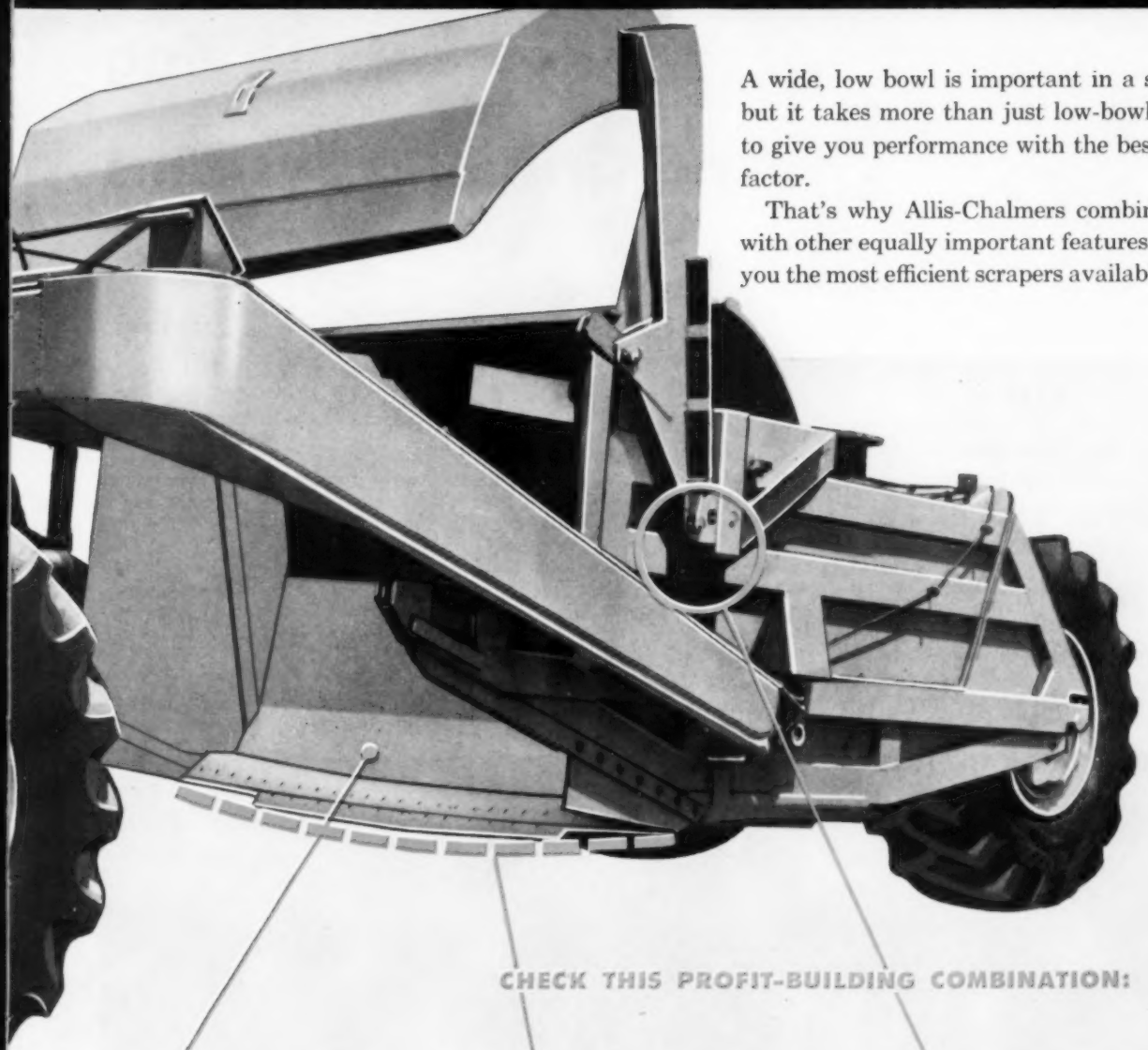
(*From page* 85.)

actually an open type Fuller Airslide conveyor, constructed of rigidly-mounted fabric, and installed on a slope of 7 degrees. These transfer the fluidized material to discharge directly into a pump hopper below the compartment from which it is moved by four pumps through 10-in. discharge pipes and lines to silos on shore. Pumps are provided with air by a battery of eight rotary compressors, and the Airslides by eight low-pressure blowers.

The group of silos and interstice bins at Fort Everglades is also provided with the above type of equipment. There are 12 of the air-activated gravity conveying systems—all 16-in. Airslide units—each having a capacity of 2,000 bbl. per hour. Cement drawn from the cone-bottom silos and from the interstice spaces is transferred to collecting and loading points over scales from which bulk truck shipments are originated.

Including the time required for loading and unloading at the respective docks, the *Florida State* makes a round trip in about 10 days. The second vessel placed in operation by Ponce for the transport of cement, as a self-unloader this ship is more advanced than its older sister ship, which has now been retired from this type of transport. It is reported that the company will add another unit comparable to the *Florida State* in the near future.

The Low-Down on Low-Bowl Scrapers



A wide, low bowl is important in a scraper, but it takes more than just low-bowl design to give you performance with the best profit factor.

That's why Allis-Chalmers combines this with other equally important features to give you the most efficient scrapers available.

CHECK THIS PROFIT-BUILDING COMBINATION:

1.

Low, wide-bowl design for fast, heaped loading.

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3.

Patented apron-ejector linkage combines high apron lift with positive, forward forced ejection—permits either quick, complete dump or smooth, even spreading.

Your Allis-Chalmers dealer will be glad to discuss these and many other profitable advantages with you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

Raw Mix Drying And Grinding Systems

By J. R. TONRY

Process Engineer
Portland Cement Association, Chicago

PART II

CALCULATION OF DRYING GASES

ANOTHER P&D EXCLUSIVE

THE hot drying gases pick up moisture in the system and are exhausted through dust collectors. Since this heat supply is an essential part of all systems, a sample calculation was made on an assumed basis. To dry 30 tons of raw material containing 5 percent moisture requires enough heat to evaporate this water, raise the materials to an elevated temperature, and allow for losses through radiation. In some cases the heat necessary to raise the ambient air to final conditions must also be added. In our calculation an item is included called "Losses," which includes preheating and radiation. This calculation provides for a temperature of 150 deg. F. in the exit gases and a humidity of 47 percent, which is well above dew point.

Conditions—30 t.p.h. of raw materials with 5 percent moisture
Hot air at 600 deg. F.
Atmospheric temperature—70 deg. F.
Relative humidity—50 percent
Raw material temperature—70 deg. F.

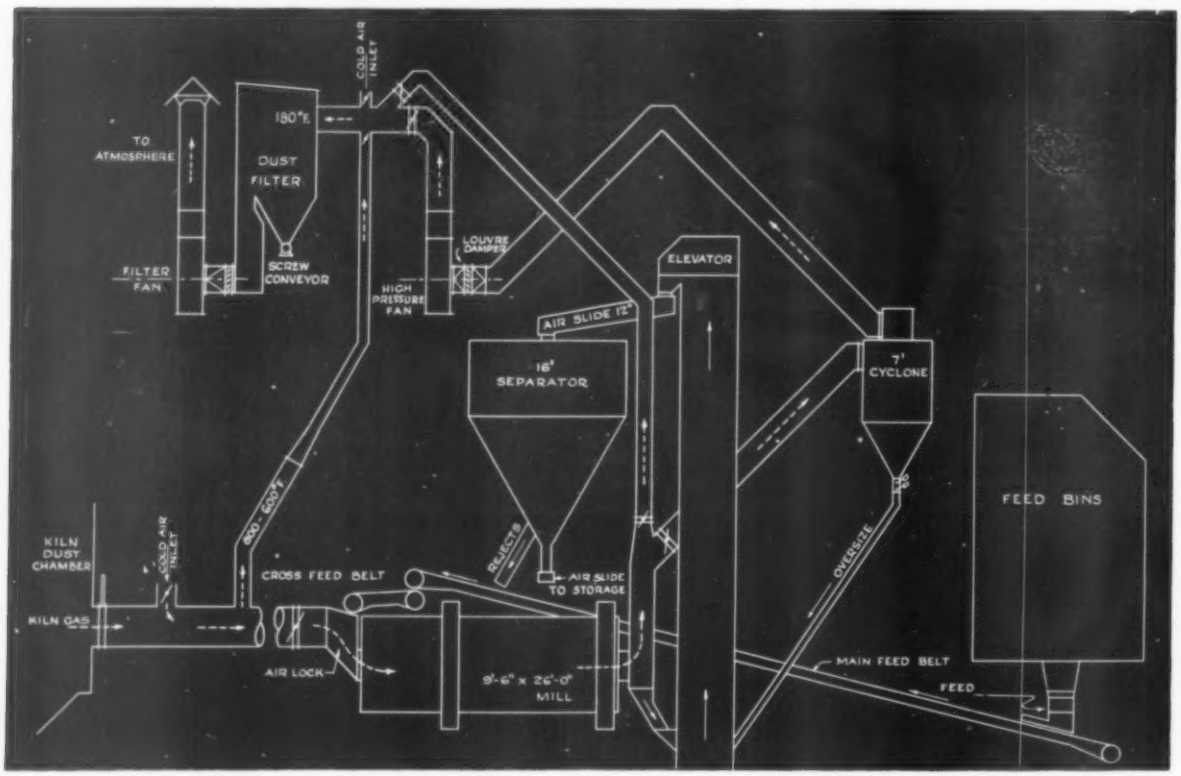

Fig. 3. Plant B—Mill using kiln gases to supply heat for drying in the mill.

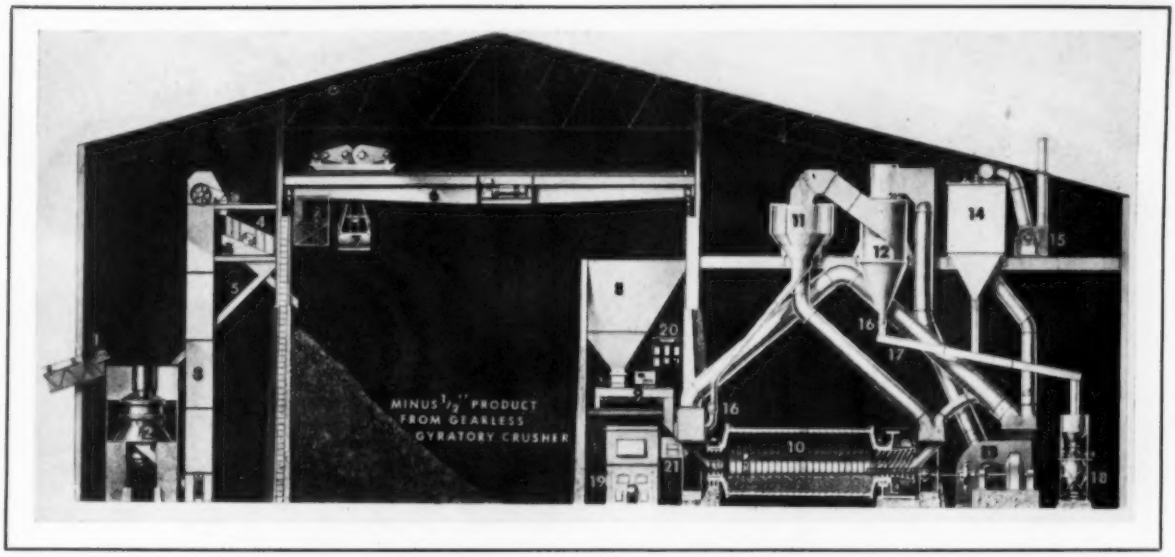

Fig. 4, Plant C—Tube mill with radial flow classifiers for drying in the mill.

Legend for Fig. 4

1. Belt conveyor-feed to crusher
2. Gearless gyratory crusher
3. Elevator
4. Vibrating screen
5. Oversize return chute
6. Traveling crane
7. Clamshell bucket
8. Mill feed hopper
9. Weighing feeder
10. Tube mill
11. Radial flow classifier
12. Cyclone collector
13. Mill exhauster
14. Dust filter
15. Dust filter exhauster
16. Rotary air locks
17. Finished material conveyor
18. Automatic pneumatic transport pump
19. Hot air furnace
20. Instrument and control cubicle
21. Automatically controlled tempering air damper

Exit gas temperature—150 deg. F. (dry bulb)

Specific heat raw materials—0.21

Raw Materials — 57,000 lb. dry basis
3,000 lb. water

Heat Required — 4,496,900 B.t.u. per hour or 152,230 B.t.u. per ton material

Hot Air—18,050 c.f.m. at 600 deg. F. consisting of flue gases and excess air from a suitable furnace.

Exit Gases—11,633 c.f.m. at 150 deg. F.

Operation The essential characteristics of the various grinding systems and operating procedures follow, with brief notes on each.

A combined drying and grinding system was used, where hot air was fed into the mill system to do the necessary drying while grinding. Equipment consisted of an auxiliary oil-fired furnace, grinding mill, air separator, cyclone scalping dust collector, bag-type dust collector, feeders, Airslide conveyors, elevators, and accessories. A connection to the dust housing at the feed end of the kiln was installed as a source of hot air. In normal operation the hot air was to come from the kiln exit gases. This is indicated in Figure 3.

The raw mix is moved on the collecting conveyor to the feed end of the mill. There it enters the mill with hot air from the kiln dust chamber. The mill discharges into an elevator which carries the raw mix up to the separator. Fines are removed from the system, and oversize is returned on the collecting conveyor to the mill. Hot air is pulled through the mill by a fan on the discharge side of a cyclone collector. The dust-laden air from the cyclone passes through a dust collector, together with dust from other points in the system. Recovered particles go back to the elevator, and then to the separator. Exit air from the dust collector is discharged to the atmosphere.

Finished raw mix is moved to storage silos by Airslides and elevators.

The separator drive has shown a tendency to overload in normal operation. To correct this condition the load limit was raised on the motors to near full rating. Control of grinding is done by the sound of the grinding mill. The possible installation of a mill level sound device is being considered for automatic feed control.

The oil-fired furnace has been taken out of service, and connections were blanked off. It was felt that it would be needed when the kiln was down, but operating experience has not justified this point. When the one kiln is off, the raw mills are shut down, without risking the kiln feed supply.

The operating crew, consisting of one miller and one oiler-sweeper for each shift, runs the finish- and raw-grinding mills. For cleanup purposes, each shift looks after a different section of the mill building.

In operating the raw mills, a temperature maximum of 180 deg. F. is observed at the dust collectors. Actual results have shown that 140 deg. F. is about as high as the exit gases rise. Inlet temperatures vary from 400 to 650 deg. F., and exit temperatures 120 to 140 deg. Since the kiln exit gases run 1,100 to 1,200 deg. F., this lower range going to the raw mills is due partly to leakage in the system at the mill feeder and other points.

A series of spouts placed in the bottom of the hot air duct remove stack dust carried by the kiln gases. They discharge into a screw conveyor and join recovered dust from the dust collectors.

The plant shown in Figure 4 had its raw grinding department modernized when dryers, storage bins, preliminary mills, tube mill and related equipment were replaced by two closed-circuit units. Drying and grinding was accomplished and at the same time more raw feed was produced than formerly.

The proportioned mix enters the mill with a stream of hot air from a stoker-fired furnace. The first compartment of the mill is charged with 3-in. balls for preliminary grinding. The second compartment does the fine grinding. To hold coarse material in the mill, a series of reverse flights are mounted at the discharge end. Loading of the mill is a critical point, as too much feed causes a higher load level and interferes with the air flow.

From the mill the hot air stream

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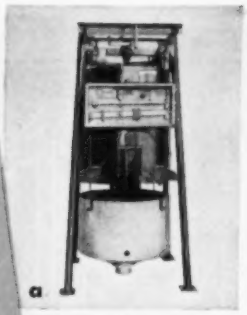

a

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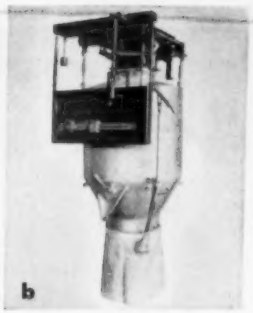

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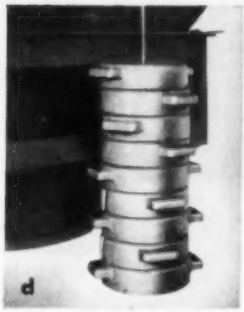

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e

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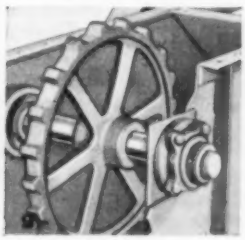

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Chain Sprockets
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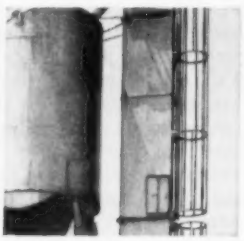

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i

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k

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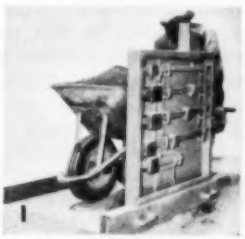
3 types: Finger-Tip Control in ½ to 2 cu. yd. sizes; 1 to 4 cu. yd. Johnson-Dravo; and 2 to 8-yd. Lo-Slump buckets.



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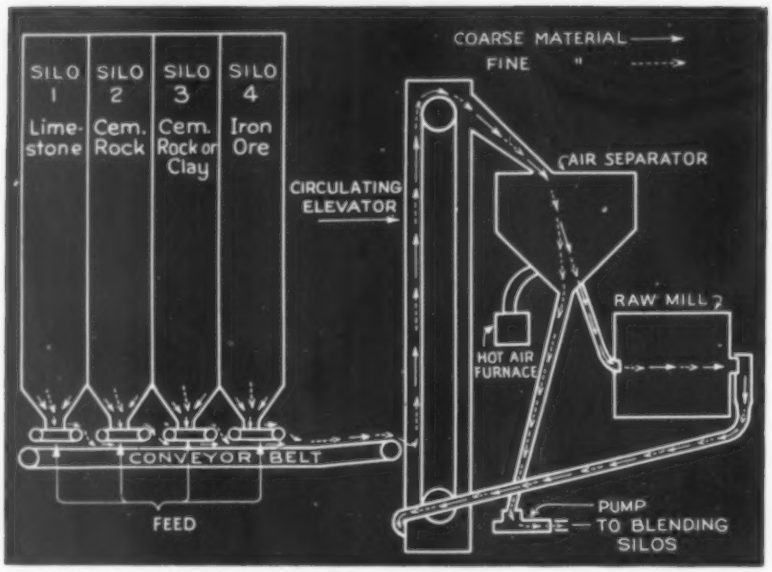


Fig. 5. Plant D—Ball mill with oil or gas-fired furnace for drying in the separator.

carries the fine material to two (9½-ft.) radial flow classifiers. Coarse material goes back to the mill feed, and fines are carried over to a set of four 5-ft. diameter cyclones. From the cyclones, the finished raw mix goes to an Airslide and then by screw conveyor and an elevator to storage silos. An alternate system of transporting the raw mix is provided in a pump to the silos. The air stream from the cyclones goes to the exhauster, and excess air passes to the dust collector and then to the atmosphere. Dust is returned to the finished raw mix in the Airslides.

The radial flow classifier is adjusted to produce the proper fineness. An inner cone is regulated to produce the maximum fineness desired and is generally left in this position. In order to produce lower finenesses a regulating baffle in the air stream is used. This is connected to an outside lever and is easily changed.

Ammeters are provided on the mill motor, exhauster motors, and dust collector fan motor. The miller watches these to check on the operation and avoid overloading.

Hot air tempertaure to the mills runs from 100 to 400 deg. F. During the winter more heat is required going to the upper range, and in the remainder of the year less heat is used, going down to 100 deg. F. or under. A typical condition shows 100 deg. F. at the mill inlet and 165 deg. F. in the air stream from the mill discharge, showing an increase in air temperature of 65 deg. F. due to grinding.

A maximum of 185 deg. F. is held at the dust collector inlet by an automatic damper in the hot air duct. In order to protect the dust collector on a shut-down, the fire is shut off before grinding the mill empty.

The hot air for both mills is supplied from a single furnace, fired by a stoker. A single large duct provided with a tempering air damper at one end goes to the feed end of the mills. This device is regulated by the raw miller as required to maintain proper temperatures.

A simplified diagrammatic flow sheet is shown in Figure 5, which accentuates the simplicity of design possible in these drying and grinding systems.

In operating the system the miller watches the elevator motor load as shown by an ammeter on the panel board. When the ammeter reading passes a marked point, he shuts off all the new feed. In case more load is required, a tester from the laboratory will adjust the feed to give a larger tonnage.

Hot air is supplied to the separator from a gas-fired furnace of 6,000,000-B.t.u.-per-hour capacity. A recorder and controller operates the fuel supply either to a high or low rate. Temperature control point is in the duct entering the dust collector. This is set at 170 deg. F. and holds within one or two degrees. In addition, the recording instrument provides a constant record of the operation.

Raw materials are proportioned from five large silos to a single belt conveyor, which delivers to an elevator feeding an air separator through a chute. Hot air is introduced into the inner cone of the separator and exhausted from the outer cone to a dust collector. Fines from the separator go to a pump which sends the raw mix to storage silos. Coarse material returns through a chute to the mill feeder. The mill discharge flows on an Airslide to the elevator, where it joins the new feed to the system. Exit air from the dust collector goes to the atmosphere, and recovered dust travels by screw conveyor to join the separator fines at the pump.

A more detailed cross-sectional diagram of a combined drying and grinding installation is shown in Figure 6. Essential equipment is indicated, with the exception of the drag conveyor located on top of the mill feed bins.

The limestone is a mixture of thin and thick bedded layers. One of the layers is of a type which is comparatively soft and has the property of holding moisture. A primary crusher is followed by a hammer mill in closed circuit with a screen which produces a stone passing a ¾-in. square hole.

Materials are fed from a 21,000-ton covered storage to the mill feed bins. Each bin is equipped with a feeder which discharges to a single belt conveyor, and then to an elevator. The latter discharges to a drag conveyor serving the three mill feed bins. When the first bin fills, material drags to the second bin, and the third bin in succession. Automatic controls prevent overflow of feed if all three bins are filled.

A feeder at the bottom of each bin delivers material to an elevator which discharges to a screw that feeds the air separator. Hot air from the furnace is introduced into the inner cone and withdrawn from the outer cone to do the drying. Finished raw mix leaves the separator and goes to a collecting screw conveyor feeding a pump. Rejects from the separator are returned to the mill for grinding. From the mill discharge a screw conveyor returns the material to the elevator, where it joins the new feed.

When the mix contains in excess of about 4 percent moisture, the tonnage must be cut back to prevent plugging in the mill. Also at this point the drag conveyor on top of the bins causes difficulty. The damp material tends to bridge over and does not move with the drag, and the operator must dislodge such build-ups.

Hot air is supplied by separate gas-fired furnaces for each mill. They operate on a high or low firing rate to keep the temperature at 180 to 200 deg. F. ahead of the dust collectors. Furnaces on two mills are rated at 6,000,000 B.t.u. per hour.

Each furnace is protected with

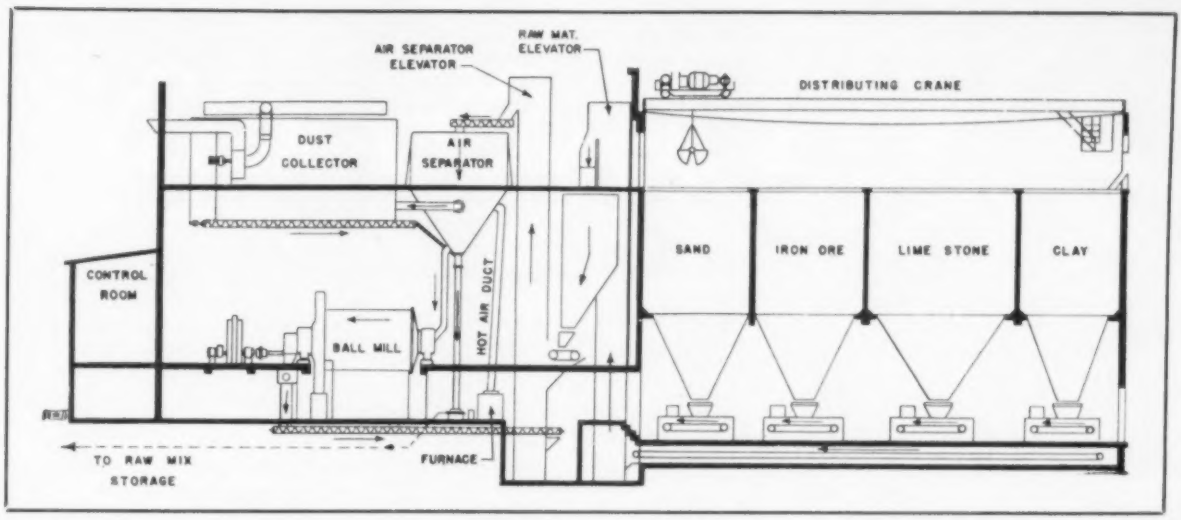


Fig. 6, Plant E—Ball mill with gas-fired furnace for drying in the separator.

suitable safety controls which automatically shut off the fuel supply in case the flame goes out.

Fineness of the product is controlled with the separator valves. Twelve auxiliary blades are used generally for regular cement, and a full set when a high fineness is desired. The bottom of the inside cone of the separator was extended down to eliminate coarse material getting through into the fines.

Figure 7 shows a layout diagram for an installation using the ball and race pulverizer for grinding.

Crushed limestone, shale, and partially dried clay are placed in separate bins from storage by a clam shell on a traveling crane. Under each bin, separate feeders proportion the mixture for raw grinding, and the material falls into a screw conveyor which empties into the bottom of an elevator, to be carried to the separator. Here the finished material is removed, and rejects are returned to the mill. Product of the mill joins the new feed at the bottom of the separator.

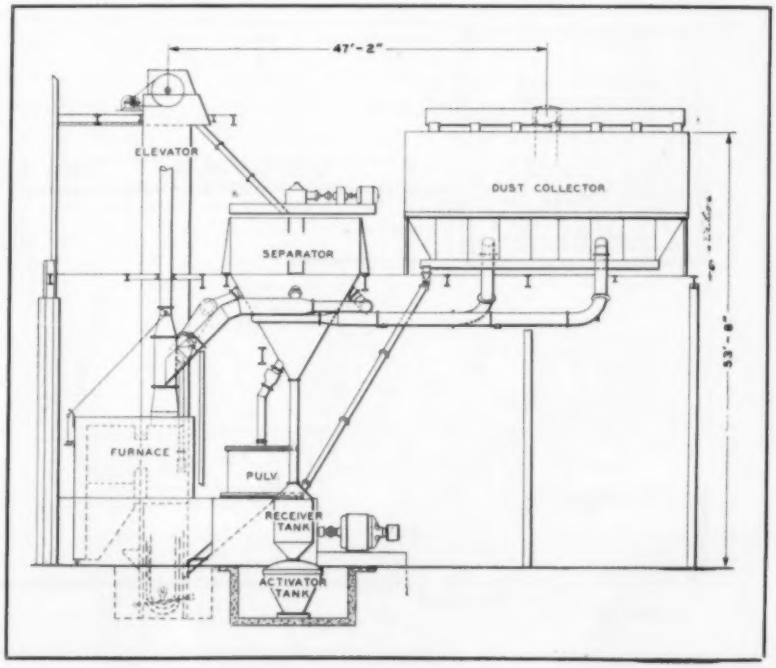
Finished raw mix drops from the separator to an air-activated conveyor. From here the mix goes to the blending bins.

A stoker and furnace supply hot air for the system. Pipes from the furnace enter the separator at four points, 90 degrees apart. A fan exhausts the air from the separator, and dust is removed in a bag-type collector.

The control points for the system are at the fines discharge from the separator, and at the fan discharge on the exit side of the dust collector. Recording thermometers keep a record of temperatures at these points. Fineness control samples are removed at the separator.

During normal operation the operator runs the entire system, from the feeders to the air conveyor. He regulates the heat into the system by varying coal feed to the stokers. This is done by watching the temperatures shown on the recording instrument. When material coming into the system is drier or wetter and causes a change in temperature, he will correspondingly increase or decrease coal feed.

Fig. 7, Plant F—Mill with coal-fired furnace for drying in the separator.



An automatic control is used to shut the stoker off when furnace exit temperature runs too high. The mill and separator motor load are not checked normally since it has been established that the elevator capacity is the controlling factor.

The system is well insulated with 1½- by 6- by 36-in., 85 percent magnesia blocks and covered with ½ in. of mortar. This includes the separator ducts and dust collectors.

The mill balls and die rings are checked once a month for wear. There is a regular schedule for replacement, which depends on ball wear. Two sets of balls are kept in use for the second and third die rings. This is done to get maximum service

from the balls and rings. In this manner two years' service is obtained from a set of rings. A schedule of ball replacement would be as follows:

Start — 9¼-in. diameter — wear down to 8⅝-in.
Start — 9¼-in. diameter — wear down to 8-in.
Replace—8-in. diameter with 8⅝-in. balls—wear down to 7⅜-in.
Replace—7⅜-in. diameter with 8-in. balls—wear down to 6¾-in.
Replace — 6¾-in. diameter with 7⅜-in. balls.

There are three sets of balls and die rings in the mill, designated as first, second, and third stages. The first stage has 12¼-in. balls and does the coarse grinding. The second and third stages use 9¼-in. balls and do the fine grinding. They start with 21 or 22 balls to a circle and are increased in number as the diameters go down.

This replacement schedule is carried on until the balls are all 6 to 6½-in. in diameter. Then new rings and balls are installed, about as follows:

1st stage—rings and balls every 4 years
2nd stage—rings and balls every 2 years
3rd stage—rings and balls every year

Figure 8 shows a complete raw grinding system in a diagrammatic flowsheet. This includes the raw material crushing and sizing equipment, together with the combined drying and grinding arrangement, complete with auxiliaries. This layout was included to illustrate an installation in considerable detail.

The proportioned mix feeds an elevator which discharges to a screw conveyor, and then to the separator. Fines are removed, and rejects make up feed for the ball mill. Discharge from the mill joins new feed in the elevator.

Hot air is introduced into the separator from an oil-fired furnace, and exhausted to a dust collector system.

Heat from the oil furnace is automatically regulated by a controller which checks temperature ahead of the dust collector. A normal range at this point is 180-190 deg. F. In the event of deviation in temperature the louvre dampers controlling combustion air for the furnace open or close. This causes a change in temperature at the furnace throat and automatically influences the oil flow. The control is set for 1,200 deg. F. at this point. When more heat is called for at the control point ahead of the dust collector, the louvre dampers begin to open. This pulls more air through the furnace, which brings its temperature down. The furnace controller then opens the oil valve to supply more heat. As a safety precaution, control thermocouples in the separator and furnace will automatically reduce oil flow in case their respective limits are exceeded. This is 1,200 deg. F. for the furnace and 600 for the separator. The temperature limit on the separator is considered necessary to avoid causing acceleration of fatigue stresses in the metal.

The hot air furnace is fired with No. 5 fuel oil and has a rating of 9,000,000 B.t.u. per hour. No. 6 fuel oil was tried in the system but was discontinued because of ignition difficulties and trouble in burning. The controller for the furnace is set to maintain a 1,200 deg. F. temperature, by changing the rate of oil flow into the combustion chamber. Electric heaters are installed to preheat the oil coming from the storage tank. The first set of heaters preheat the oil to 120-130 deg. F. This oil is pumped to the furnace area, where it is heated to 200 to 230 deg. F. A recirculation system helps condition the oil coming from storage.

When the raw grinding system was first started, wet material would cause the mill to plug and fill the separator. With experiences such as this and accumulation of operating knowledge, the operators learned to watch the feed and raise the temperature in the system as needed.

(*Continued on page* 115)

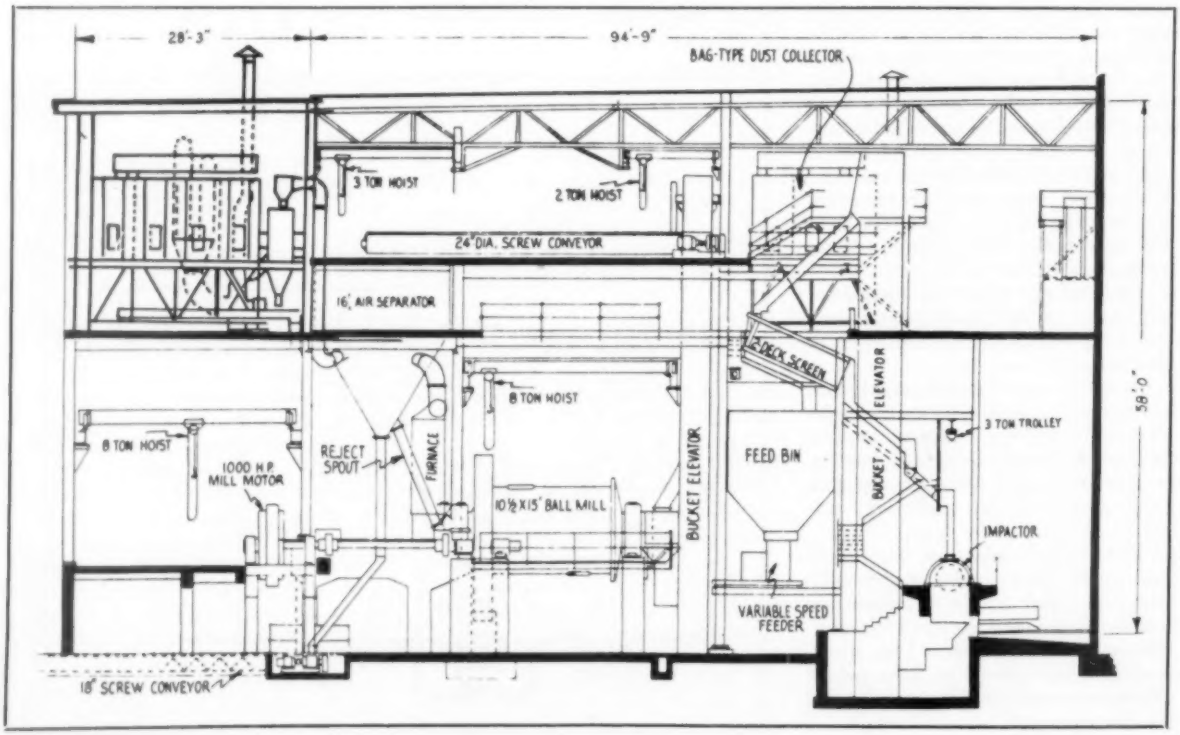


Fig. 8, Plant G—Ball mill with oil-fired furnace for drying in the separator.

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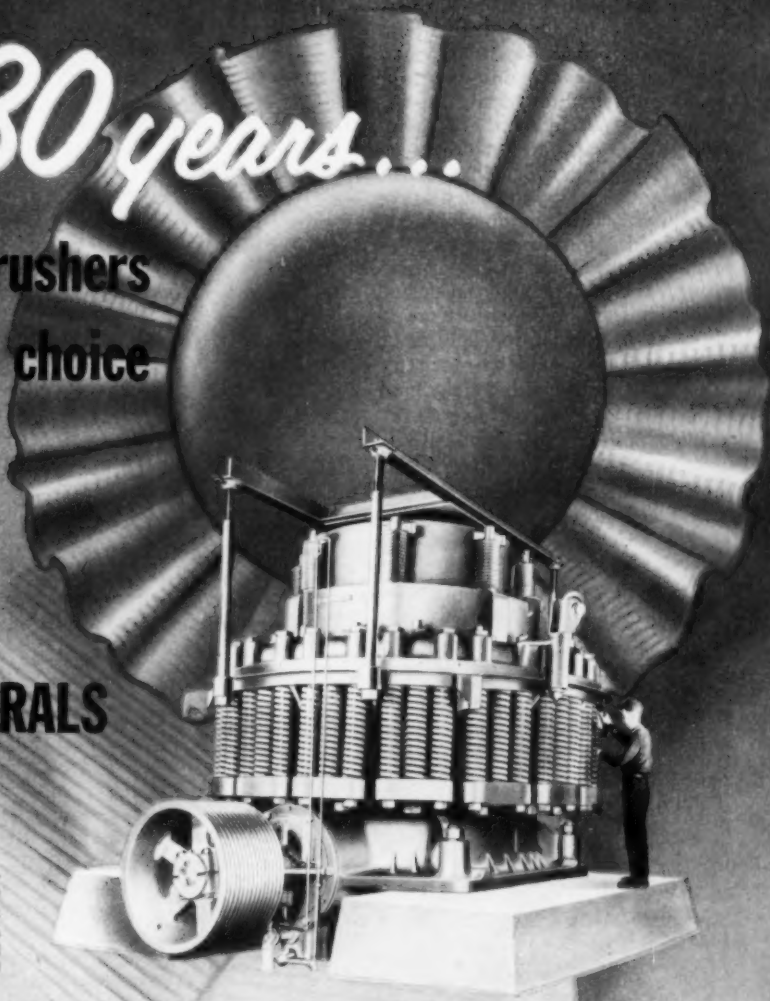

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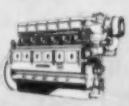

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proper evaluation of hard surfacing materials*

By D. B. Rankin
Rankin Manufacturing Co. A.W.S.

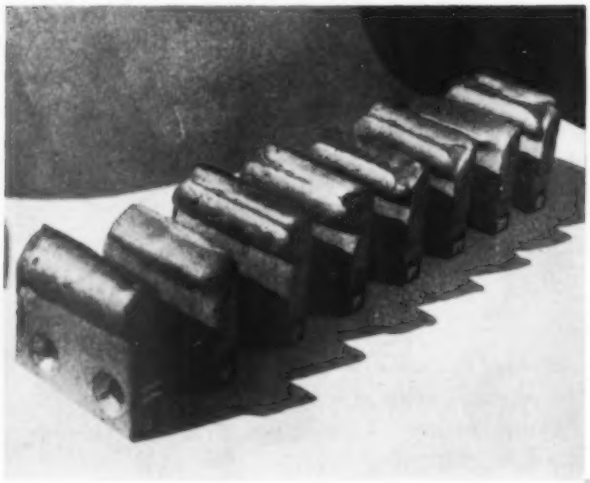
FOR the benefit of any who may not be too familiar with the term "hardsurfacing," we want to start this discussion by explaining that the expression is used to describe a process employed to deposit a layer of highly wear resistant material over those parts of a machine surface that are going to be subjected to extremely abrasive conditions. By employing this procedure, we are able to manufacture the part proper from strong, relatively tough steel and protect it from wear with a covering of hard, abrasion-repelling metal which in itself would be much too brittle to constitute the main body of the piece.

The application is practically always made by using the hardsurfacing material as a welding rod and simply depositing it with either the electric arc or the oxy-acetylene process.

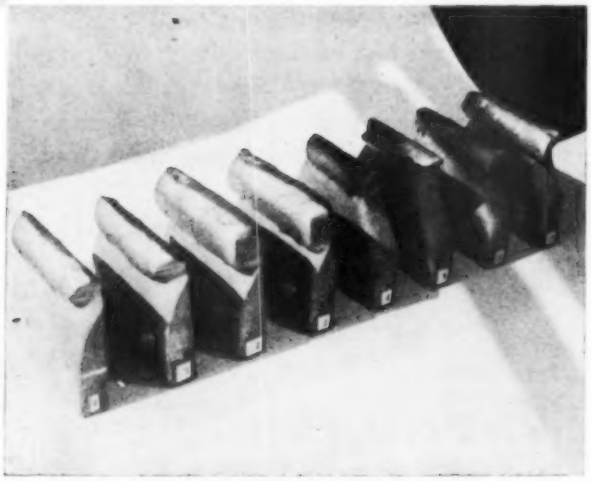
Originally, many attempts were made to evaluate the relative worth of these materials according to such factors as their hardness or their total alloy content, etc. Quite early in the life of the industry such efforts proved futile because no quantitative relationships could be established between such arbitrarily chosen features and actual wear pattern. It was found that in many instances a softer surface would outwear a harder one; or a rod with lower alloy content would produce a facing which under many conditions would outwear that of one having a higher alloy content.

For a number of years, research men have been attempting to devise

*A paper presented at the Tenth Western Metal Congress, Los Angeles.



A set of mill hammers used to crush automatic welding rod flux. Each was faced with a different rod, but the same procedure was used. Obviously, the material used on the one at the extreme left is the best material for this job.



A set of the same type of hammers, all of which had been hardsurfaced with the same material, but applied by different procedures. Plainly, the method employed on the third and fourth from the left is the best one to use.

a laboratory test which would accurately determine the relative wearing qualities of different metal surfaces . . .

Many and varied machines have been built and their accuracy subjected to quite intensive examination. We will not attempt in this paper to describe these instruments or the manner in which they were used. We will, unfortunately, have to state that to date not one has been universally accepted as being capable of accurately measuring what might be called absolute wear resistance on a standardized scale. Nor has one been so accepted as being able to predict, with complete accuracy, the relative wearing characteristics of two metal surfaces under varied sets of conditions.

During the course of these investigations a number of interesting and somewhat unexpected discoveries were made. To mention one of these, it was found that a metal surface "A" may last considerably longer than metal surface "B" under one set of abrasive conditions, but the exact reverse may be found to hold when conditions are substantially altered.

Such phenomena as this and other similarly singular behaviors seem pretty much to preclude the possibility of a universal wear-testing machine, and about the best we can hope for from the laboratory at present is an estimate of the relative abrasion resistance of two materials under the more or less exact conditions of the laboratory test.

At this point we should like to hasten to add that all of this exploratory work has in no way been in vain, for by correlating results obtained from it with actual field observations we have learned a great deal "wear-wise" about alloying combinations. These discoveries have gone a long way toward constantly improving products in the hardsurfacing industry, as well as suggesting more effective ways of applying these products.

At present the only reliable way to determine how well a hard-surfacing rod is going to do a job or how much superior or inferior it is to some other rod, is to perform actual tests in the field.

When field testing is to be engaged in, there are four important considerations to be kept in mind.

Compare Appropriate Competing Rods The first of these is that only the rods from each manufacturer's line which are best suited to do the job should be tested against those from competitive lines.

There are two ways of ascertaining which of any manufacturer's products best qualify to meet the conditions a prospective user may have in mind.

Most producers have published lists showing which of their various surfacing alloys have been found best suited for various applications. One procedure is to take these recommendations at their face value and proceed to test the one listed as most likely to be successful. This is by far the most popular method and the safest in that the designation in itself indicates that the material has been found to perform well and without trouble on applications suggested for it.

Often, however, it is not as simple as that since frequently two or even more rods from a given line are indicated for certain applications. This in itself can only mean that the laboratory is not, in all cases, positive about which one will prove most satisfactory.

Of course, the main reason for this lies in the fact that many individual users may be operating the same piece of equipment under such radically diverse conditions that each is best suited with his own type of hard rod.

To illustrate, we may mention that most sets of crushing rolls remain in service for several weeks or months, but in some isolated instances, wear is so drastic that they will not perform efficiently for one whole shift, or for the full number of shifts.

In a case like this it can be (and has been) found that a lower-priced material that may even be cheaper to apply will not be nearly so economical to use as a more costly one that will stand up to eliminate mid-shift shut-downs for maintenance purposes.

Such factors call for serious study of the particular problem at hand; they tend to indicate that in many cases at least two members of the same family should be tested against each other to determine which one should be compared with competitors.

Correct Application Techniques Let us now examine the second important consideration in field testing. This concerns itself with correct application techniques; and "important" is hardly a strong enough adjective since the wearing properties of hardsurfacing deposits have been found to be so tremendously affected by different application procedures. In fact, the difference between the service obtained by applying the same material with different procedures will often far exceed the differences between quite unlike alloys applied the same way.

Here again, the manufacturer should be able to indicate in a general way which procedures will give the best results with each of his products, but it still must remain with the user to determine for himself which is the overall most economical one for him to employ.

The first of possible welding variables is the *polarity setting* of the welding machine itself. If a rod will perform correctly on only one of the two possible polarity settings, that, of course, is the one that must be used. If the electrode runs on either polarity, straight will give faster deposition rate, less dilution from parent metal, and higher build ups, all of which are generally desirable. On the other end, most bi-polarity rods operate much more smoothly on reverse polarity; and if a relatively thin smooth deposit with an assured sound strong bond is desired, reverse polarity is the one to use.

The next variable is the *ampere or heat setting* of the welding machine. Higher ampere settings will, of course, give substantially faster deposition rates. At the same time, they introduce appreciably more heat into the parent metal and result in more dilution of the overlay with this metal. Higher deposition rate, we fear, is too often the prime concern of many welders. And often, where high amperages are employed excessive dilution from parent metal will result in a surface whose composition is so different from that conceived by the manufacturer that its wearing characteristics will be nearly completely destroyed.

At this point, we wish to say that there are a few hard rods that give deposits which are definitely superior when cooled as slowly as is practically possible; and for these, high ampere settings and reverse polarity are generally preferable.

However, in a great majority of cases, the parent metal (particularly if it is the widely used manganese steel, which is greatly harmed by exposure to high temperatures) is left in a much more desirable condition when not overheated; and nearly all hard-facing overlays benefit in direct proportion to the speed with which they are colled. Rather

astonishing as it may seem, a case is on record where the wearing life of a surface was actually tripled by applying it with 50 amperes less heat.

This brings us back to the subject of deposition rate and the objection that operating at lower amperes "takes too long to do the job."

In order to interest users in persuading their welders to see if they do not greatly improve the performance of hardsurfacing materials by depositing them at reduced amperages, let us consider the following.

By actual measurement, a $\frac{3}{16}$-in. diameter rod, operating at 175 amperes, required 62 seconds to be consumed. An identical stick of the same material, pulling 125 amperes, took 76 seconds to burn off. This represents a difference of 14 seconds per stick or approximately 100 seconds or 1.6 minutes to the pound.

To determine what this means in an actual although somewhat exaggerated case, let us take, for example, a hard-facing job done on a set of roll shells in which perhaps 100 lb. of the material is being applied. If we were operating at the lower amperage, we would increase the welding time to do this job by 160 minutes or 2⅔ hours. We believe all will agree that this increase in application time becomes most inconsequential if the life of the shell is increased from a month to three months, two months, or even a month and a half. Not only is down time drastically reduced, but also the welding costs.

As another illustration we might consider a case where a set of four shovel teeth are being hardsurfaced. The quantity of rod to do such a job as this is usually approximately 6 lb. At the low amperage only 10 more minutes would be required to face them than at the higher, and if they lasted any discernible time longer this would be the amperage to use.

Surely it should be more than worth while to give very serious attention to this matter.

There are a number of other variables possible, but the only one that we shall now mention is the generally highly beneficial results of applying a *double pass* of rod to a surface. On the obvious face of it, this doubles the cost of the operation and in some cases it results in a higher build up than is desired. (In isolated instances it might set up undesirable strains in the parent metal.) However, here again, startling results have been obtained by multipassing, and it is not exaggerating too much to say that a double pass surface can last three or even four times as long as a single pass would. We do not contend that this is *always* the case, but we know of no place where it has not run twice as long as a single pas; so no harm can come from trying it.

Quantity and Cost of Application The next consideration in field evaluating hard rods is the actual *quantity* of each *applied* and, what is most important, the *overall cost* of applying it. Of course, it goes without saying that when two materials are being compared in the field, it is desirable that identical quantities of both be applied to their relative surfaces. This does not necessarily mean that identical quantities should be *used*, because some rods have a much higher recovery rate, and it takes less of these to do a given job than it does of some with higher welding losses. The ultimate aim in testing should be to cover each of the surfaces in question as close as possible to the same thickness.

If an accurate record of the quantity of each rod used, the price of each, and the welding cost to apply has been kept, we can calculate the actual cost to do the job with each rod. Such comparative figures often reveal some rather startling things; and due to higher losses and slower deposition rate, it is not unusual to find that a relatively cheaper rod will cost as much or even more to cover a given surface to a fixed thickness than a much costlier one.

Estimate of Work Done The final consideration in field testing of hardsurfacing materials consists in an accurate estimate of the exact work accomplished by each one during the test. Although mentioned last, this is of course, just as important in reaching a fair and accurate conclusion as any of the other three.

The ideal setup is to have the material being tested operating side by side on exactly the same tonnage or footage of the same material. However, great care must be exercised to see that they are actually both performing the same quantity of work. A very common application for comparing hardsurfacing materials is on shovel teeth. In many cases, if the teeth on a bucket are faced with two or more materials for comparison, no poorer choice of a test spot could be made. The reason is that plainly where a shovel is operating against a bank at its side, no two teeth are actually doing exactly the same amount of digging, and therefore comparisons of their wear rate are without any real factual meaning.

Unless one is sure that the bucket will be digging head on during the comparison period, it is better to face the entire set with the same rod and run for a desired time and then repeat this procedure using a new set all faced with the material being compared. Even then it must be assured that both sets did the same amount of digging against the same material before an impartial comparison can be made.

Comparisons on crushing roll shells have also often been made, and results were incorrectly interpreted. This is apt to be the case if each shell was faced with a separate material. Here, the failure to recognize the fact that the driving roll usually wears considerably faster than the driven roll is a source of a common mistake.

Sometimes half the periphery through a vertical plane of each shell is faced with materials under observation. Comparison of the relative wear on each half after a given run may lead to erroneous conclusions unless great care is exercised to be certain that the feed is the same on both faces. Even then wrong conclusions can be derived from the fact that the side wearing away the fastest will allow more larger-mesh materials being crushed to pass and consequently will not actually do as much real crushing as the second faced section surfaced with the more wear-resistant material.

These illustrations could be multiplied by many many more but we feel that the above will illustrate amply the precautions that must be exercised in conducting a field evaluation of hardsurfacing materials.

Summary Since, at present it is impossible to conduct quantitatively exact wear-resistant tests in the laboratory, it is necessary that the manufacturer and user alike determine relative wear resistance by their own field tests themselves.

In order to obtain, actually reliable results from a field test, the user must, make sure (1) that he is testing the best material designed by the manufacturer for his application; (2) that the welder is operating the test at a correct polarity setting on the welding machine; (3) that he is applying the rod at the right heat; (4) that an actual cost record has been kept; and (5) that both materials are doing the same quantity of work during the test interval.

Illustration from Agricola's De Re Metallica (1621)

only the richest ores could be processed

Back when they had to be processed by hand, only the richest ores were refined. For—even though manpower was practically free—the methods were so crude that too much of the valuable metal was lost.

Today, ore bodies that were ignored only a few decades ago are being processed profitably. This is due in large part to efficient grinding mills that turn out many tons of properly sized ore every day . . . mills that often utilize CF&I Grinding Balls and Rods. Always made from special analysis steel with the ideal balance between toughness and hardness, CF&I Grinding Balls and Rods assure optimum grinding ability and maximum wearability.

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ACP, Radioactivity Among Topics Discussed At N.A.L.I. Board Meeting

By BUREN C. HEROD

DISCUSSIONS during the annual midyear meeting of the National Agricultural Limestone Institute board of directors reflected the broad aspect of interests common to this group and its members. Held at the Edgewater Beach Hotel, Chicago, Ill., on June 17 and 18, the two-day session was devoted to individual committee meetings on the first day, followed by reports of those groups to a general board meeting at the concluding session.

Among the pertinent topics reported out of committee and discussed in the general session were the Agricultural Conservation Program and concomitant agricultural activities, tax legislation, promotion and education, and state association activity, as well as membership, administrative, and financial business of the institute.

Russell W. Hunt (Southwest Lime Company, Neosho, Mo.) N.A.L.I.'s chairman of the board, presided over the general meeting. With respect to the 13th annual convention, to be held January 20-22, 1958, at the Statler Hotel, Washington, D. C., the convention arrangements committee made recommendations relative to both the business and social activities proposed for that meeting. It was suggested that President Robert M. Koch again extend an invitation to those legislative and administrative officials in Washington who participated in the outstanding convention program last January.

Powell G. Potts (Southern Stone Co., Inc., Franklin, Ky.) reported for the legislative and public relations committee, in presenting several of that group's recommendations. Support of a move towards expansion of ACP appropriations was suggested, along with that of consolidating ACP and Soil Bank programs and activities. In the field of tax legislation, it was recommended that this group add its official voice to those of other segments of industry in opposition to continuance of transportation taxes. It was also suggested that this organization serve official notice of its support of the small business tax relief measure now pending in Congress.

In opening his midyear report, the president, Mr. Koch, noted that while growing pains have been experienced during the past years, the institute has established a firm footing, and major controversies are no longer in evidence. It was pointed out that healthy committee activity has resulted in unburdening the board of directors of a load of details with which they no longer have to contend.

It was stated that many services have been increased, with promotion, membership, and representation at the Washington level reflecting expanded efforts. Among current activities the accent is on improving the aglime usage situation through intensified efforts in legislative areas. Concentration on increased membership has resulted in an organization of such size that its opinions are seriously regarded on national levels, it was stated.

Also, it was noted, educational efforts are being expended toward getting an increase in ACP appropriations. Due to these consistent efforts, and a regular presentation of facts regarding the industry, a substantial segment of Congress has been educated to factors and problems common to agriculture, the use of aglime, and the industry members who produce this material.

The Atomic Age and attendant

Among the officers and directors in attendance (front row) were: Robert M. Koch, N.A.L.I. president; Russell W. Hunt (Southwest Lime Co., Neosho, Mo.), chairman of the board; W. E. Stone (Armco Steel Corp., Piqua Quarries, Piqua, Ohio), vice-chairman of the board. Second row: Robert M. Bridges (Consumers Co., Chicago, Ill.), executive committeeman; L. R. Falk (L. R. Falk Construction Co., St. Ansgar, Iowa), director; Leonard S. Fry (Fry Coal & Stone Co., Mercersburg, Pa.), executive committeeman; Bill Hewitt (East St. Louis Stone Co., East St. Louis, Ill.), executive committeeman; and Lynn N. Stewart (Meshberger Stone Co., Inc., Columbus, Ind.), director.

research has opened significant new horizons, Mr. Koch noted. Recent studies were pointed out in which radio isotopes were added to aglime applied to soils, thus providing a method of establishing the degree of absorption of lime in a plant at various stages of growth by determining the isotope count in that plant. Along another line on which experimental evidence is admittedly meager, as yet, AEC representatives have nevertheless stated that the use of aglime has reduced the plant absorption of strontium 90 fallout. As a consequence, it was noted, both agronomic and future safety are factors of prime importance to be considered by Congress, federal agricultural agencies, farmers, and industry members.

In regard to aglime sales prospects during the current year, an optimistic note was struck, since many producers have already reported increases. This is undoubtedly due in part to an improvement reported in ACP administration of the agricultural program.

In comparing participation of farmers in Soil Bank and ACP programs, it was pointed out that there are only 85,000 enrolled in the former, while over 1,000,000 are participating in the latter. Factors indicated as affecting the degree of participation in ACP were payment rates, which have been raised in several areas, and mandatory soil tests. With respect to the latter, Mr. Koch pointed out that the facts continue to show that elimination of the mandatory test is followed by an increase in the use of aglime.

During the current year the membership committee has originated a series of five letters to prospective members, as reported by William E. Stone (Piqua Quarries, Piqua, Ohio), chairman. Other activities of this committee, which consists of the same members as last year, involve the distribution of letters to the membership inquiring as to the success individual producers have had in meeting certain industry problems. The letter also invited comments or suggestions concerning additional services that may be provided by the institute.

Chairman R. O. Bemis (Basic Inc., Cleveland, O.) reported on recommendations of the promotion and education committee. Suggestions were made concerning the revision of institute circulars; a possible study directed toward furnishing news releases to smaller, local, farm radio stations, and state committees and similar groups; and the possibility of applying other promotional media such as calendars.

Among those at a social gathering in the headquarters suite were Robert M. Bridges, regional vice-president, and Mrs. Bridges (Consumers Co., Chicago, Ill.); Mrs. L. R. Falk, Mr. Falk (Falk Construction Co., St. Ansgar, Iowa); and Mrs. T. C. Adams, Cerulean, Ky.

The state associations committee, through Earl D. Werner (Princeville Stone Co., Princeville, Ill.), chairman, also recommended that more educational and promotional data be furnished by the institute to various farm group agencies on both state and national levels. It was recommended that as an important factor of good will and public relations, the state associations committee be continued as an active group.

A combined report for the five regional committees was made by Dana G. Farber, (Farber White Limestone Co., Franklin, N.J.), vice president of region I. It was recommended that support be lent to modification of the mandatory soil test where such is restricted on lime applications. It was also suggested that effort be expanded toward increasing payment rates for limestone, particularly in those areas where available allocations are not being expended. It was pointed out that the purchase order situation merits attention, in order that these may be made available to farmers in all counties.

In line with Mr. Koch's comments above concerning the relationship between lime and radioactive products in the soil, it was recommended that a study be made of the potential import and use of aglime in the control of such fallout. The suggestion was made that aglime promotional efforts be on a broader basis such as that of emphasis on its characteristic as a plant food, rather than on acid correction.

In bringing the board session to a close Mr. Hunt noted that the chief executive office of the institute, which he holds, is now benefiting from the hard work done by those holding it during previous terms. He also pointed out that the major efforts of the institute should be directed toward a more wide spread application of the ACP program.

Raw Mix Drying

(*From page* 108)

When the separator filled, it was necessary to dig it out laboriously.

Two dust collectors handle the exhaust gases from each circuit, one low-resistance collector acting as a scalper to remove a part of the dust load ahead of the bag-type collector. This has been of considerable value, as shown by a low bag replacement figure of 18 in 1½ years of operation in the main dust collector. Orlon bags are used in the bag-type collectors to resist high temperatures and combustion gases.

The process of combined drying and grinding makes possible the use of large mills, compact layout of equipment, and improved operation not possible in the older system of separate drying and grinding.

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WILLIAM S. ZEIGLER was elected to the board of directors of the Inland Cement Company, Ltd., Edmonton, Alta., Can., at the firm's annual meeting. Mr. Zeigler is executive vice-president of Inland.

2,000 Tons per Day Dredged by SanGravl Co., Inc. From TVA-Made Lake

ANOTHER P&D EXCLUSIVE

THE men of SanGravl Co., Inc., stood on the hillside 12 years ago and watched the waters of the Tennessee River begin slowly to fill their big new harbor. It marked the end of an old era and the beginning of a new one for the company.

The harbor had been built by the Tennessee Valley Authority as part of the relocation of SanGravl from its old site in the valley, which was now becoming Kentucky Lake. Several months before the company had moved, along with the town of Johnsonville, Tenn., to the new location on high ground. Since 1927, the company had been removing sand and gravel from the bars of the Tennessee, and now a new operation would have to begin.

Now located on the shore of its new harbor, SanGravl, a division of T. L. Herbert & Sons of Nashville, began dredging sand and gravel from the bottom of the new lake. The bars of the river were relatively easy to locate to anyone familiar with the old channel, and SanGravl's operators, Allen Carman and his sons, Phil and Bill, knew the Tennessee like an old friend. That friend is now giving up material to SanGravl at the rate of about 2,000 tons per day, keeping their 35-man crew busy 5½ days a week.

At the SanGravl operation on Kentucky Lake, Ky., sand and water, picked up from the pump, are loaded into a barge by a flume at the side of the dredge. It takes about three hours to fill a sand barge, while a gravel barge is loaded in about an hour and a half.

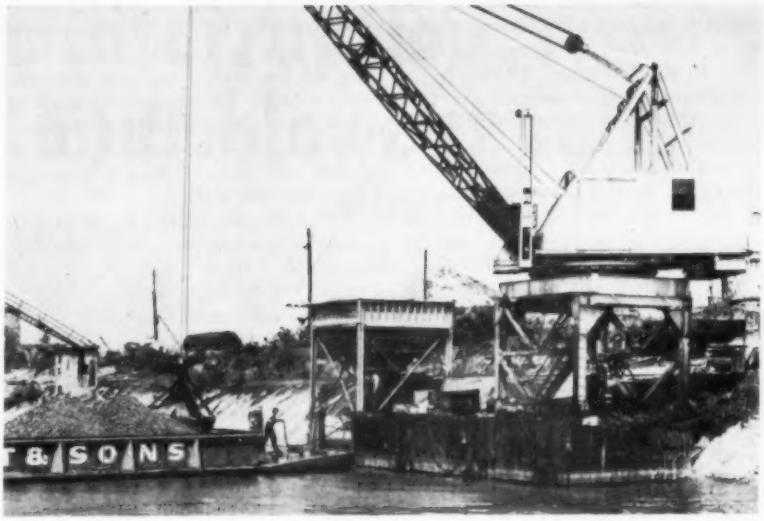
The company operates a Thomas Foundries NOL dredge on a 182-ft. barge which is able to work in 60 ft. of water with its 77-ft. pipe. Since the bars of the Tennessee are loose deposits, no cutting is required, and silt occurrence is minor.

Powered by two Caterpillar D13000 diesel engines, the gravel pump on the dredge is driven by a line shaft through V-belts. Material is picked up through a 16-in. intake and released through a 12-in. discharge. A screen at the pump separates the brown silica gravel from sand and occasional shellfish which get too near the pipe. A conveyor carries gravel to one of the two 300-ton barges moored alongside the dredge, while sand is loaded by a flume into the other barge. Each gravel barge can be loaded in about an hour and a half, a sand barge taking about 3 hours. Power to operate the conveyors and other equipment on the dredge is provided by a Cat D13000 engine with 220-volt a. c. generator.

The dredge is kept supplied with barges by SanGravl's tender, *Blanche*, a 39-ft. boat powered by a Caterpillar D17000 engine. The *Blanche* shuttles bach and forth between the dredge and the lakeshore, where empty and full barges are moored until they are to be moved, and also serves the men on the dredge as transportation to shore at the end of the day.

Twice a day SanGravl's tow boat, *Allen Carman*, named for the general manager of the plant, brings in

SanGravel's converted rail crane unloads gravel from one of the barges brought in by the "Allen Carman." The unit was converted to electric power and mounted on pilings for use in unloading.



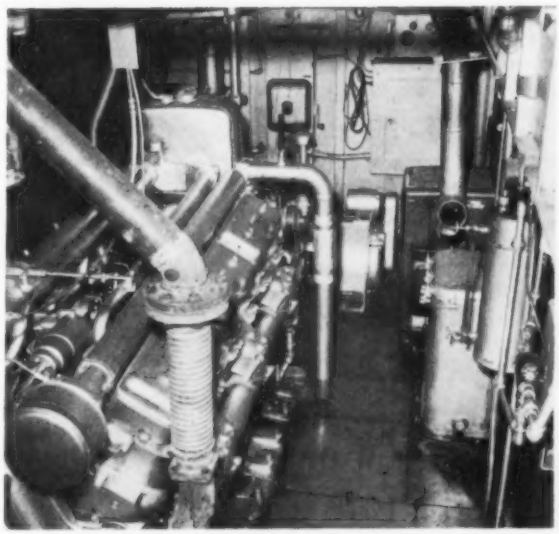
empty barges and picks up loaded ones for the 12-mile trip back to the processing plant. The *Allen Carman* is larger and more powerful than the *Blanche,* measuring 51 ft. 9 in. and powered by a 320-hp. Caterpillar D386 engine with Falk reversing gear. Electric power for the boat is supplied by a Cat D311 electric set.

Constant contact is maintained between the boats, the dredge, and the home plant by means of a Karr two-way radio set. Automobiles of the Carmans are also equipped with sender-receiver sets.

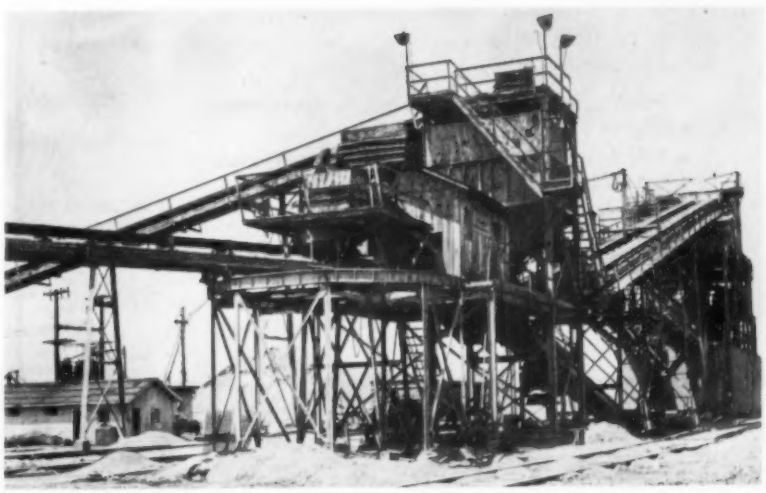
On each trip, the *Allen Carman* moves four loaded barges to the plant. The 1,600-ft. long harbor allows plenty of room for maneuvering the barges in to the unloading point. There, a 25-ton American Hoist crane with a 3-cu. yd. Hayward clamshell unloads material. Formerly a steam-powered rail crane, the unit was converted to electric power and mounted on permanent pilings by SanGravl. During most operating days the crane handles all unloading, but on especially busy days, a spare stiff-legged crane is used to load sand directly into cars of the N.C. & St. L. Railroad on a spur running alongside the harbor.

During regular operations, a 320-ft. conveyor carries material from the bank to a hopper at the plant. Under the hopper is a pants-leg chute which directs gravel into the plant, or sand into railcars. Since the sand is a finished product direct from the river bottoms, it needs no processing and is loaded into cars for shipment or moving to stockpiles in the company's four-track yard.

Gravel from the pants-leg chute passes by conveyor to the top of the plant, where it is fed into a 4- by 12-ft. Allis-Chalmers Low Head three-deck screen, which removes



Power for the "Allen Carman" is supplied by a 320-hp. diesel engine, with reversing gear. A generator set, partially visible at the rear, provides electricity for the boat. The vessel employs a unique hydraulically-boosted cable control for steering the rudder. She makes two trips a day, moving gravel to SanGravl's plant at Johnsonville, Tenn.



The swinging conveyor mounted on the track at the center of the picture is used to load sand directly into rail cars from the hopper. When gravel is being loaded for shipment, a conveyor picks it up from the bins (right) and directs it onto the loading belt. Tracks extend along both sides of the plant to allow for loading rail cars without in-between stops.

large material. From the screen, the gravel is fed into the primary crusher, a 3-ft. Symons cone unit, and then to the secondary 24- by 40-in. Cedarapids roll crushers. At this point the gravel has reached the bottom of the plant and is directed back onto the main conveyor to the top again. In this manner, SanGravl is able to eliminate bucket lifts and utilize available equipment to the utmost.

On the second trip down, the crushed gravel passes over two 4- by 12-ft. Allis-Chalmers Low Heads which separate ¾-in. and larger sizes. Minus ¾-in. passes through to two Cedarapids 4- by 12-ft. two-deck units which screen off ½- and ¼-in. Remaining gravel and washing water passes through to a 5- by 12-ft. Symons screen which separates to $\frac{3}{16}$-in. The tailings and water are allowed to run into a settling tank for later removal to stockpiles.

Under the screening plant are located six bins, each holding 90 cu. yd. of sized gravel from the screen. Sizes from $\frac{3}{16}$-in. to 1¼-in., in graduations of ¼ in., are stored here. Running lengthwise under the row of bins is a conveyor belt leading out to the carloading area. By opening any of the bins, gravel of a specified size, or a mixture of several sizes, may be loaded. During loading of the cars, a scale on the conveyor keeps a running tabulation of how much has been loaded. Even distribution of the load is insured by using an electric donkey cable to spot the cars.

The entire plant is electrically powered, electricity being readily available from the Johnsonville steam generating plant, located about a mile from SanGravl.

When rail cars are loaded, they are moved around the yard by two Caterpillar D8800-powered 25-ton American Hoist railcranes, converted from steam and gasoline power. After the crane has spotted a car near the proper pile, it unloads what is needed to maintain stocks.

SanGravl ships entirely by rail; however, private trucks do pick up material for local use. For loading trucks and general yard work, the company has three mobile units, a Caterpillar D13000-powered Northwest crawler crane with 1½-cu. yd. clam, a Bucyrus 10-30D crawler crane with ¾-cu. yd. clam, and a Hercules-powered Hough HF wheel loader.

During the 12 years since Kentucky Lake covered its original operation, SanGravl has dredged about 10 miles each way from the plant. The Carmans believe that with the present operation, dredging to a distance of 25 miles each way is possible. This means the Tennessee River will continue to be a good friend for many years to come.

Pacific Coast Borax Co. Completing $18,000,000 Plant

The $18,000,000 borax plant of the Pacific Coast Borax Company, a division of the U. S. Borax & Chemical Corporation, at Boron, Calif., is nearing completion. The project includes production facilities for borax and other borate products, as well as packaging and shipping facilities.

Four massive thickener tanks, said to be the largest covered and insulated tanks of their type in the world, have been installed, in addition to driers, ore storage bins, and the steam plant. Some of the new facilities are already in use.

Engineering, designing, and construction of the large plant, which covers 80 acres, is a joint venture of the Southwestern Engineering Company and Twaits-Wittenberg Company.

Vern Schield Learns Facts About Car Made in U.S.S.R.

Vern L. Schield, president of the Schield-Bantam Company, Waverly, Iowa, wanted to find out about Russian automobiles. So he bought an M-20 Pobeda in Helsinki, Finland, last Spring. From March 21 through April 6 the Russian car was tested by *Science and Mechanics Magazine*.

The Pobeda, a 52-hp. model, has a four-cylinder engine, compared with American makes, which go as high as 300 hp., 8-cylinder jobs. The tests revealed that it took the Pobeda 39.6 seconds to accelerate from zero to 60 m.p.h., compared with 11 seconds (average) for American cars tested by *Science and Mechanics*. Overall fuel mileage of the Pobeda was 15½ miles per gallon; American cars average 11.6. The Pobeda thus offers no sensational saving in fuel to compensate for its power lack.

In appearance, it was reported, the Pobeda has the combined features of the Plymouth, Ford, Chevrolet, and Nash of the middle and late 40's.

Net profits of the St. Lawrence Cement Company, Villeneuve, Que., Can., for 1956, its second year of operation, amounted to $484,248, or 23 percent above the 1955 total.

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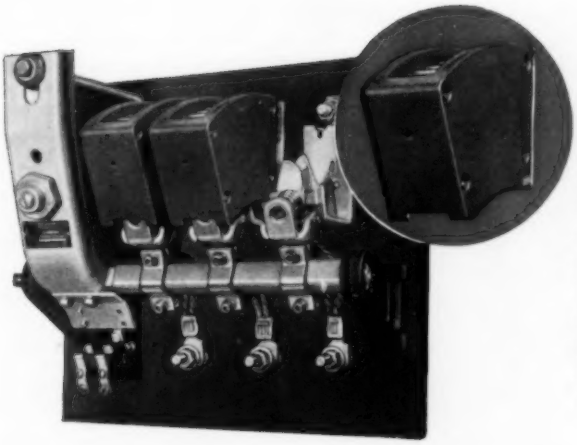
for fast arc interruption... without blowout coils



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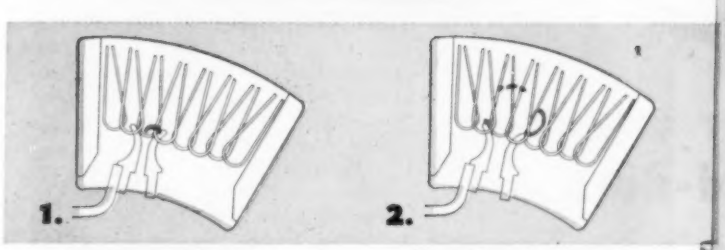
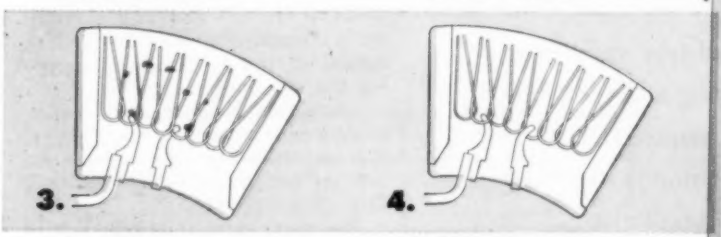
featuring *ACBO* arc-centering blowout chutes for 50 to 400 hp

The advanced electrical design of Allis-Chalmers Size 4, 5 and 6 control incorporates a modern principle of arc interruption for low voltage, high horsepower applications. The *ACBO* arc chute utilizes principles of magnetic action and thermal convection to center, rupture and extinguish the arc . . . quickly. Fast arc interruption assures maximum contactor efficiency, improves performance — greatly prolongs contact and chute life.



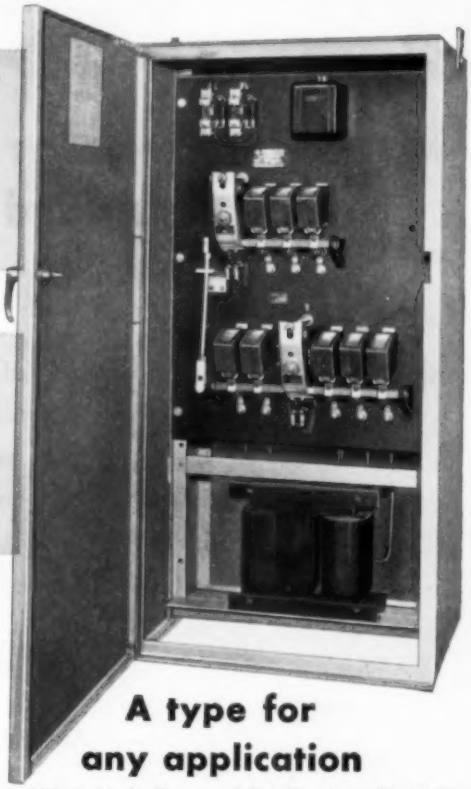
Arc across contacts as they start to open.

Strong blowout action forces arc to center.



Arc rupturing.

Contacts fully open— arc extinguished.



Simplified mechanical design

- Streamlined clapper-type construction eliminates many parts.
- Accessibility simplifies maintenance and inspection.
- Installation is fast and easy . . . sensible enclosure dimensions provide ample wiring space.

A type for any application

Type 425 control offers a wide selection of starters and contactors for any application. For detailed information, call your A-C Control Distributor or your local A-C District Office . . . or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin. Ask for Bulletin 14B8615.

A-C ALLIS-CHALMERS

ACBO is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5343

BETTER CONTROL with MARION'S

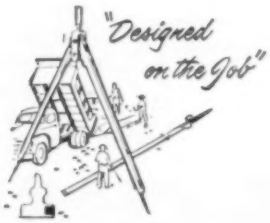
NEW SPOOL-TYPE VALVE

designed for use with standard-duty hoists

MARION'S new pump with spool-type valve gives far superior control for all dumping and spreading operations. It can readily be adapted for cable control when desired. The new pump is used with both offset manifold and hose adaptation. It is interchangeable with the present-type standard duty pump. Get all the facts about it and about extra performance-proved MARION dump bodies and hoists from your distributor . . . or write direct today.

MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO, U.S.A.



Expansion to Triple Output Of Caribbean Cement Co. To 300,000 Tons Per Year

Industrialization of Jamaica, B.W. I., has been so rapid that construction suppliers are hard pressed to keep up with the demand for their products, according to the Jamaica Industrial Development Corporation.

The Caribbean Cement Company is an indication of this progress. This firm has doubled its output recently, and now is considering additional expansion which will triple production, to keep pace with consumption on the island.

Sir William Stephenson, chairman of the board of the Caribbean Cement Company, announces that a second kiln will bring cement production to 200,000 tons per year when it begins operations next year. A third kiln, now in the planning stage, will boost the output to a total capacity of 300,000 tons, or 7,200,000 bags.

So. California Minerals

(*From page* 91)

superheated steam traveling at supersonic velocity. The terrific speed at which the talc circulates in the steam causes the individual particles to break up by abrasion and by impact. As the particles whirl about in the mill, they are separated by centrifugal force. The finest particles segregate on the inside of the mill tube and are withdrawn through an outlet at the top. Size of the product is controlled by the rate of withdrawal of the spent "fluid" carrying the micron-sized particles.

Steam from a conventional boiler is subjected to super-heating before it is introduced, at 140 lb. pressure, into the continuous tube of the mill through multiple jets.

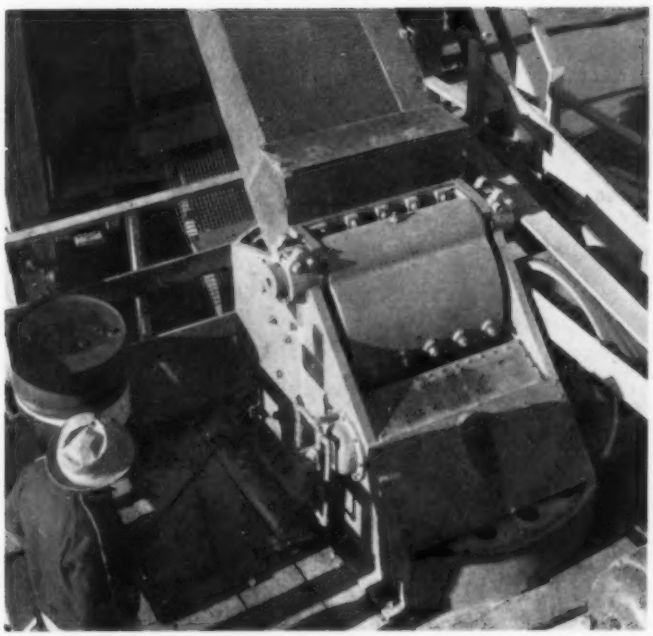
The product of this mill, in the 99.5 percent through 400-mesh and 90 percent 5-micron range, is highly desired, particularly by the paint industry for use in extender pigments.

Three St. Regis packers in the plant are used to sack the various products into 50-lb. paper bags before shipment. A Flexoveyor is used to flatten the filled bags and convey them to the warehouse area. The plant is served by a Dracco dust-collecting system.

This company's end products are used in a long list of manufactured products. Paint and ceramics are probably the most important. Rubber, insecticides, textiles, roofing, paper, cosmetics, and pharmaceuticals are items. Talc is also being used in the food industry for polishing rice.

5 TIMES LONGER JAW PLATE SERVICE IN CRUSHING EXTREMELY HARD GRAVEL

. . . *"crushing without rubbing" principle of* KUE-KEN® CRUSHERS *eliminates abrasion—the main cause of jaw plate wear*



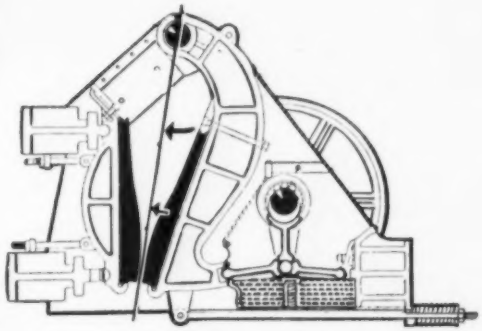
36" x 10" Kue-Ken crushing extremely hard gravel. This operator installed a duplicate Kue-Ken in another plant.

Kue-Ken eliminates a major expense in jaw crusher operation . . . frequent jaw plate replacements. Unlike all conventional crushers, where some of the jaw plate is rubbed away with every crushing stroke Kue-Ken crushes without rubbing by gripping the rock squarely and crushing without upward or downward action. Jaw plates last at least 5 times longer saving replacement cost and frequent production losses from downtime. Also, Kue-Ken is the only crusher that eliminates shutdowns caused by rapid wear through dirt and grit in the operating mechanism. It has a crankcase-type lubrication system with all mechanism operating in a sealed bath of clean, filtered oil. Overload cannot damage Kue-Ken . . . safety device instantly releases flywheel. Automatic pressure switch sounds alarm or stops motor.

Kue-Ken crusher size	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

• Table of tons per hour that will pass through crusher with jaws set at dimension shown when measured in the closed position.

• Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.



Jaw plates last at least 5 times longer . . . only Kue-Ken crushes without rubbing.

See how the hinge pin is located on the center line of the crushing zone. The jaw moves in an almost straight line. Rock is instantly gripped and crushed without rubbing.

WRITE FOR CATALOG

KUE-KEN® CRUSHERS

STRAUB MFG. CO., INC. 8386 Baldwin St., Oakland, Calif.

"CRUSHING WITHOUT RUBBING"

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

DEALERS:
SEATTLE, WASH. . . . . Washington Machinery Co.
SALT LAKE CITY, UTAH . . . . . Lund Machinery Co.
SAN ANTONIO, TEX. . . . . Closner Equipment Co.
PORTLAND, ORE. . . . . Contractors Equipment Co.
LOS ANGELES, CALIF. . . . . Garlinghouse, Fremon Co.
PHOENIX, ARIZ. . . . . Stapley's
DENVER, COLO. . . . . Union Supply Co.
CASPER, WYOMING . . . . Moss Equipment & Supply Co.
VANCOUVER, B. C. . . . . Universal Equipment Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

Preliminary Report on Mineral Output Of South Central States in 1956

Missouri A new record for mineral production in Missouri was established in 1956, with the total value estimated at $160,700,000, according to the Bartlesville, Okla., office of the Bureau of Mines, U.S. Department of the Interior. This total exceeded the previous record set in 1955 by nearly $9,000,000. Nonmetals contributed 62 percent of this natural wealth, metals 28 percent, and mineral fuels 10 percent. Principal minerals produced in 1956 included lead, cement, stone, coal, lime, and sand and gravel. For the 49th consecutive year, Missouri ranked first in lead production.

Nonmetals contributed the major portion of the total mineral value of Missouri in 1956, with an estimated value of $99,000,000. Cement, stone, lime, sand and gravel, and clays were the principal nonmetals in terms of value.

Barite—Missouri continued as the nation's second largest producer of barite. Production and value increased in 1956 due to increased drilling activities in the petroleum industry. Washington County was the state's largest producing area.

Cement—Production of cement continued to expand in 1956, as demand continued high throughout the year due to increased construction. There were five cement plants operating in four counties, with the largest production in St. Louis County.

Clays—Clay production in Missouri in 1956 was estimated at 2,500,000 tons valued at $7,100,000. Clays produced were mainly fire clay and miscellaneous clays, used to produce refractory material and heavy clay products, respectively. Clays for use in the manufacture of cement were also produced.

Lime—Missouri lime production in 1956 was greater than that of 1955 in spite of the decreased demand for use as flux during the six-week steel strike. Production was reported in six counties, with largest production in St. Genevieve County. Chemical and industrial uses consumed most of the 1956 output.

Sand and Gravel—1956 production of sand and gravel in Missouri showed an increase over 1955. Production came from 79 counties. The five leading producing counties in terms of value were: St. Louis, Jefferson, Franklin, St. Charles, and Jackson. Sand and gravel was used mainly for building and paving purposes.

Stone—Missouri production of stones increased in 1956 in line with increased construction. Granite, marble, limestone, sandstone, and miscellaneous stone were obtained from sources in the state. Limestone supplied approximately 90 percent of the value of stone production. Limestone was used for concrete, road metal, and agricultural purposes, and in the production of cement and lime. Miscellaneous stone was used for riprap, road metal, and railroad ballast. Dimension stones were used for building and monumental purposes.

Asphalt (Native)—The Barton County Rock Asphalt Company obtained native asphalt from deposits in Missouri in 1956.

Mineral Production in Missouri, 1955-56 (a)

Mineral	1955 Short Tons (unless otherwise stated)	1955 Value	1956 (Preliminary) Short Tons (unless otherwise stated)	1956 (Preliminary) Value
Barite	363,692	$ 4,003,842	385,000	$ 4,235,000
Cement, 376-lb. bbl.	12,255,346	34,912,186	12,319,000	35,109,000
Clays	2,402,401	6,902,323	2,500,000	7,142,000
Coal	3,232,485(b)	12,771,570(b)	3,265,000(b)	—(c)—
Copper (recoverable content of ores, etc.)	1,722	1,175,977	2,130	1,534,000
Iron ore (usable) long tons, gross weight	260,560	—(c)—	250,000	—(c)—
Lead (recoverable content of ores, etc.)	125,412	37,422,941	122,000	39,040,000
Lime	1,464,828	14,408,279	1,599,000	15,766,000
Sand and gravel	9,890,518	9,727,092	10,187,000	10,213,000
Silver (recoverable content of ores, etc.) Troy ounces	268,620	243,115	377,200	340,000
Stone	22,714,766	31,250,757	24,490,000	32,072,000
Zinc (recoverable content of ores, etc.)	4,476	1,101,096	3,920	1,050,000
Undistributed: Native asphalt, cobalt, natural gas, nickel, petroleum, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference (c).		3,855,277		20,250,300
TOTAL		$151,813,000(d)		$160,659,000(d)

(a) Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

(b) Preliminary figures.

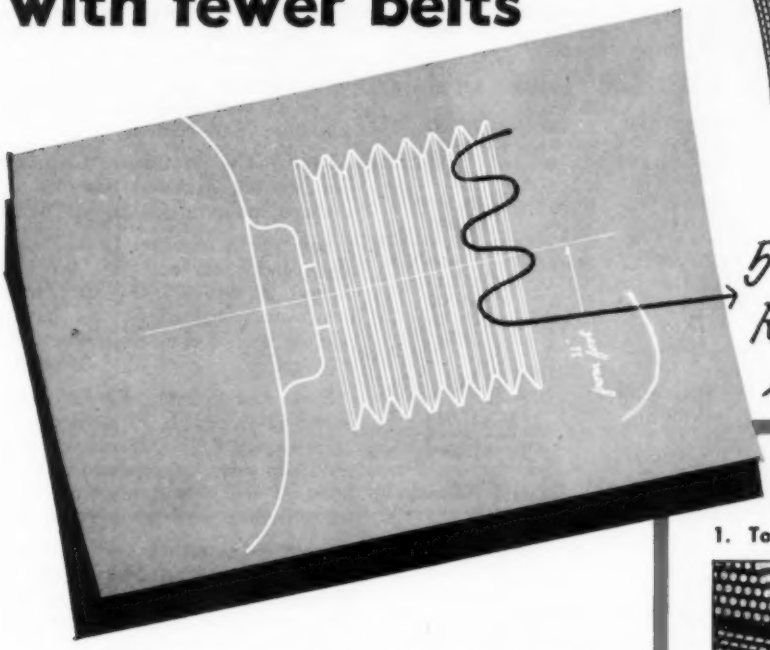
(c) Value included with "Undistributed."

(d) The total has been adjusted to eliminate duplication in the value of clays and stone.

Arkansas Following the national trend of a prosperous, expanding economy, the value of mineral production in Arkansas reached a record high of $142,800,000 in 1956, a slight increase over the previous record of $141,100,000 in 1955. Mineral fuels were responsible for 62 percent of the state's

Cut sheave width and weight...

get same horsepower with fewer belts



5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because a Gates Super Vulco Rope has 40% more horsepower capacity — delivers more horsepower per dollar invested than any standard V-belt drive. Sheaves with fewer grooves cost less . . . weigh less . . . take less room. Drive design is invariably improved.

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-belt specialist. Stocks carried in industrial centers around the world.

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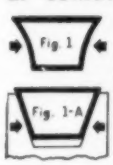
The Mark of Gates Specialized Research

No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords

Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

TPA 248

Gates Super VULCO ROPE Drives

Mineral Production in Arkansas, 1955-56 (a)

Mineral	1955 Short Tons (unless otherwise stated	1955 Value	1956 (Preliminary) Short Tons Unless otherwise stated	1956 (Preliminary) Value
Barite (crude)	462,896	$ 3,755,094	480,000	$ 3,898,000
Bauxite, long tons, dried equivalent	1,721,243	14,026,190	1,675,000	13,651,000
Clays	738,637	2,375,882	817,000	2,630,000
Coal	577,726(b)	4,319,146(b)	665,000	—(c)—
Iron ore (usable), long tons, gross weight			7,200	36,000
Manganese ore (35% or more Mn.), long tons	21,200	1,727,286	25,538	2,081,000
Natural gas, million cu. ft.	32,123	1,799,000	34,000	1,949,000
Natural-gas liquids:				
Natural gasoline, thousand gal.	47,483	3,239,000	47,000	3,018,000
LP-gases, thousand gal.	57,088	2,169,000	59,400	2,732,000
Petroleum (crude), thousand 42-gal. bbl.	28,506(b)	77,250,000	28,800	78,105,000
Sand and gravel	9,003,162	7,662,942	9,273,000	8,046,000
Stone	6,176,313	8,025,634	6,485,000	8,560,000
Slate	47,529	431,022	48,000	435,000
Gem stones		4,000		20,000
Undistributed: Abrasive stones, masonry cement, gypsum, lime, ground sandstone, and iron ore		15,099,360		18,451,000
TOTAL		141,107,000(e)		142,832,000(e)

(a) Production as measured by mine shipments or mine sales (including consumption by producers) except that fuels and gypsum are strictly production.
(b) Preliminary figure.
(c) Value included with "Undistributed."
(d) Value estimated.
(e) Total has been adjusted to eliminate duplication of clays and stone.

mineral production, nonmetallic minerals for 27 percent, and metallic minerals for 11 percent. The five principal commodities in order of their value in 1956 were crude petroleum, bauxite, stone, sand and gravel, and cement.

Barite—Arkansas continued to be the nation's leading producer of barite in 1956 with an estimated 480,000 tons valued at $3,900,000. The demand for barite continued to increase in 1956 due in part to the extensive exploration programs of the oil and gas industries, which require more "drilling mud" for deeper holes. All of the barite production in the state was from Hot Springs County.

Clays—Clay production in Arkansas continued to increase in 1956, amounting to an estimated 817,000 tons valued at $2,600,000. Miscellaneous clays accounted for the major portion of the output, and fire clay the remainder.

Sand and Gravel—Sand and gravel production continued to increase in 1956 as a result of the state's expanded economy. The production is estimated at 9,300,000 tons valued at $8,000,000. White River Sand and Gravel started operations south of Monte Ne, Ark., with a daily production of 150 to 200 tons of sand and gravel per day.

Stone—Stone production in Arkansas continued to increase during 1956 with an estimated total of 6,500,000 tons valued at $8,600,000. Crushed limestone, crushed sandstone, dimension sandstone, granite, roofing granules, and miscellaneous stone are produced with crushed limestone, the major production.

Miscellaneous Nonmetallics—These commodities have been grouped under "distributed" to avoid disclosure of individual data, and consist of abrasive stone, cement, masonry cement, gypsum, lime, soapstone, recoverable elemental sulphur, roofing granules, carbon black, and gem stone.

Louisiana The total estimated value of Louisiana minerals established a new record of 1,300,000,000 in 1956, a $118,000,000 increase over the previous record value in 1955, according to the Bartlesville, Okla., office of the Bureau of Mines. Mineral fuels accounted for 92 percent of this value, with nonmetallics responsible for the remainder. No metallic minerals were reported in Louisiana in 1956. Nearly all of Louisiana's 63 parishes reported mineral production of some kind.

Cement—Production and value of cement increased again in 1956 to satisfy the demands for residential and general construction.

Clay—An estimated 707,000 tons of clay was produced in Louisiana in 1956, mostly miscellaneous clay. Some bentonite also was produced in the state. The clay was used mainly for heavy clay products, lightweight aggregate, and cement.

Lime—The Mathieson Chemical Corporation produced lime for its chemical plant in Calcasieu Parish.

Salt—Salt, reported from 5 parishes, increased to 3,900,000 tons valued at $16,800,000. Salt from brine continued to be the largest part of the production, followed by rock salt.

Sand and Gravel—Sand and gravel produced in 20 parishes was an estimated 8,800,000 tons, a 3 percent gain over that reported in 1955. Most of the output was consumed for structural and paving purposes.

Stone—Oystershell was produced from Jefferson, St. Mary, and St. Tammany parishes; a small amount of miscellaneous stone was produced in East Baton Rouge Parish.

Sulphur—Sulphur produced by the Frasch method in Louisiana in 1956 was an estimated 2,200,000 long tons, valued at $61,500,000. Elemental sulphur also was recovered from natural gas in East Baton Rouge and Calcasieu parishes.

Mississippi The total 1956 value of mineral production in Mississippi established a new record estimated at $133,600,000—10 percent greater than the 1955 record of 121,500,000. Mineral fuels accounted for 90 percent of the total mineral value, and nonmetallic minerals the remaining 10 percent. There were no metallic minerals reported for 1956. Crude oil was the most valuable mineral, accounting for 74 percent of the total value, followed in order of their importance by natural gas (14 percent), sand and gravel (4 percent), and clay (3 percent).

As a result of an expanding economy, the production of clays, sand and gravel, and cement continued to increase.

Texas The total 1956 value of mineral production in Texas was estimated at $4,300,000. Texas

Mineral Production in Louisiana, 1955-1956 (a)

Mineral	1955 Short Tons (unless otherwise stated)	1955 Value	1956 Short Tons (unless otherwise stated)	1956 Value
Clay	651,268(b)	$ 659,099(b)	707,000(b)	$ 717,000(b)
Natural gas, million cu. ft.	1,680,032	189,844,000	1,867,500	211,028,000
Natural gas liquids:				
Natural gasoline and cycle products, thousand gal.	782,328	59,158,000	843,150	60,572,000
LP-gases, thousand gal.	291,138	10,323,000	327,600	14,057,000
Petroleum (crude), thousand 42-gal. bbl.	271,010	785,090,000	297,000	870,210,000
Salt (common)	3,562,636	15,406,993	3,883,000	16,794,000
Sand and gravel	8,574,020	10,941,860	8,831,000	11,489,000
Sulphur (Frasch), long tons	2,072,418	58,027,704	2,197,000	61,516,000
Gypsum	355,371	586,900	345,000	604,000
Undistributed: Cement (includes mason), lime, stone, sulphur (recovered elemental) and bentonite		16,971,611		18,193,000
TOTAL		1,145,148,556(a)		1,263,203,000(c)

(a) Production as measured by mine shipments or mine sales (including consumption by producers), except that fuels and gypsum are strictly production.
(b) Excludes bentonite which is reported under "Undistributed."
(c) Adjusted value to avoid duplicating clay and shell used for cement and lime.

remained the major producer in petroleum, natural gas, natural-gas liquids, helium, bromine, sulphur, and magnesium chloride used for metal. Significant tonnages of iron ore, clay, gypsum, cement, salt, and stone were also produced. Important smelting and refining capacities of aluminum, antimony, copper, iron, lead, mercury, and zinc, as well as the total domestic capacity for magnesium and tin, were located within Texas boundaries. Mineral production was reported from 230 of the state's 254 counties.

All materials of construction—cement, clays, gypsum, lime, and stone—reached record levels of output. Sand and gravel alone showed a slight decrease. This increase was the direct result of the rising trend in industrial, commercial, and public work construction programs. Foremost among new industries in Texas in1956 were oil refining, chemical, petrochemical, rubber, and fabricated metals. The abundant resources of fuels, lime, salt, and sulphur of Texas were the essential requisites to the state's rapidly growing chemical industry, particulary the industrial acids, alkalies, and petrochemical products.

Barite—Barite which was imported from other states and from foreign countries was ground and processed in mills at Cameron, Harris, and Nueces counties. The 1956 milled output was greater than in 1955 as the oil and gas industry continued its search for more reserves.

Cement—Output reached 24,000,000 bbl., valued at $64,800,000. The cement industry of Texas continued its expansion and modernization of facilities, some programs having been initiated several years earlier.

Clay—Output totaled 3,300,000 tons, valued at $5,500,000. There was a considerable increase in new and expanded facilities manufacturing various types of clay products in Texas during 1956. Principal uses of clay in Texas were in the manufacture of cement, building brick and heavy clay products, lightweight aggregate, and building and ceramic tile. Special clays as bentonite and fuller's earth were used principally in drilling muds, in oil refining, and as a filtering media. A new and important use was developed for bentonite as a sealing agent to prevent water loss through seepage in surface reservoirs and irrigation canals. The new method should find extensive use in the drought stricken Southwest.

Feldspar—Grinding plants in Burnet, Gillespie, and Llano counties ground and prepared feldspar for the ceramic and whiteware industries. The crude material was imported into Texas from surrounding states.

Graphite—Graphite was produced in Burnet County by the Southwestern Graphite Company.

Fluorspar—Several crushing plants and mills treating fluorspar ores from western states and Mexico operated in Texas in 1956.

Gypsum — Output reached 1,400,000 tons, valued at $4,400,000. Continued high demand for gypsum existed in 1956 as industrial and business construction remained at record levels. Principal uses for gypsum were wallboard, lath, sheathing, building and industrial plasters, and as a retarder in cement.

Lime—Lime output of 644,000 tons, was valued at $6,100,000. Lime production from both oystershell and limestone remained at record levels in 1956. Principal uses were in the chemical, industrial, and building industries. Production originated in seven counties, the three principal

Mineral Production in Mississippi, 1955-56 (a)

Minerals	1955 Short Tons (unless otherwise stated)	1955 Value	1956 (Preliminary) Short Tons (unless otherwise stated)	1956 (Preliminary) Value
Clays	700,615	$ 3,913,113	800,000	$ 4,239,000
Natural gas, million cu. ft.	163,167	15,664,000	196,000	18,816,000
Natural gas liquids:				
Natural gasoline and cycle products, thousand gal.	22,382	1,573,000	25,700	1,716,000
LP-gases, thousand gal.	12,242	396,000	11,000	440,000
Petroleum (crude), thousand 42-gal. bbls.	37,280(b)	91,710,000	40,400	99,406,000
Sand and gravel	5,624,878	4,603,032	5,794,000	4,833,000
Stone	572,816	572,816	638,000	638,000
Undistributed: Nonmetallic minerals		3,589,504		4,102,000
TOTAL		$121,490,000(c)		$133,589,000(c)

(a) Production as measured by mine shipments or mine sales (including consumption by producers), except that fuels are strictly production.
(b) Preliminary figures.
(c) Total has been adjusted to eliminate the duplication in value of clay and stone.

counties being Nueces, Comal, and Harris.

Mica—Mica imported from other western states was ground at a mill in Tarrant County.

Oystershell—Output totaled 11,200,000 tons, valued at $15,000,000. Oystershell was dredged from reefs in bays along the Gulf Coast of Texas. Principal uses were in the manufacture of cement and lime, as an aggregate in concrete, and for road surfacing.

Perlite—Crude perlite imported from western states was crushed and expanded in plants located in four Texas counties. Principal uses were for lightweight aggregate in plaster and concrete, and as a loose-fill insulation material.

Pumicite—Pumicite used as a lightweight aggregate in plaster and cement, as an insulating material, and as an abrasive in cleaning and scouring compounds was mined and processed in Starr, Scurry, and Dickens Counties in 1956.

Salt—Output was 3,900,000 tons, valued at $14,000,000. Salt production continued to new record levels in 1956 following the growing pattern of the state's impressive chemical industries. Major portion of production was recovered from salt wells as salt in brine. The immense salt domes along the Gulf Coast offered tremendous reserve potentials.

Sand and Gravel—Output in 1956 amounted to 29,300,000 tons, valued at $27,000,000. The 1956 production declined slightly from 1955 record output because of the marked decline in residential construction, even though demand from industrial, business, and highway construction remained at record levels. The trend toward use of portable preparation plants continued during the year.

Stone—1956 output of stone reached 28,100,000 tons, valued at $35,100,000. Stone output, including oystershell, continued to new records in 1956. Crushed limestone and miscellaneous stone were the principal products. Most of the crushed material was used for building and paving purposes and in the manufacture of cement and lime.

Sulphur—Sulphur output in Texas in 1956 totaled 4,100,000 long tons, valued at $114,900,000. The 1956 output and value of sulphur reached new records in Texas, as the state's industrial expansion continued unabated. The year 1956 saw the first sulphur leases issued in the Tidelands area off the Texas coast.

Talc and Soapstone—Talc and soapstone were mined by open-pit methods and processed for use in the ceramic, insecticide, roofing, and rubber industries. Production in 1956 exceeded that of 1955.

Vermiculite—Although there are no known commercial deposits of vermiculite in the State of Texas, crude material was imported from adjoining states and processed for use as a lightweight aggregate in plaster, as an insulating filler, and as a soil conditioner. The exfoliated material has desirable acoustical and thermo insulating properties when used as a lightweight aggregate in plasters and cements; it is also fire resistant.

Mineral Production in Texas, 1955-1956 (a)

Mineral	1955 Short Tons (unless otherwise stated)	1955 Value	1956 Short Tons (unless otherwise stated	1956 Value
Cement (masonry), 376-lb. bbl.	817,253	$ 2,728,253	846,674	2,845
Cement (portland), 376-lb. bbl.	24,038,427	64,820,374	25,235,000	69,144,000
Clays	3,103,359	5,182,757	3,277,000	5,521,000
Gem stones	.....	115,000	.....	115,000
Gypsum (crude)	1,349,434	4,219,652	1,390,000	4,350,000
Helium, cu. ft.	139,396,988	2,271,642	145,830,220	2,364,000
Iron ore (usable), long tons	875,443	—(b)—	835,000	—(b)—
Lime	584,855	5,549,309	644,300	6,121,000
Natural gas, million cu. ft.	4,730,748	378,464,000	5,133,000	436,305,000
Natural-gas liquids: Natural gasoline, cycle products, thousand gal.	2,987,808	206,506,000	3,107,600	204,046,000
LP-gases, thousand gal.	3,450,430	110,414,000	3,838,300	148,621,000
Petroleum (crude), thousand 42-gal. bbl.	1,053,297	3,004,980,000	1,112,700	3,160,057,000
Salt (common)	3,583,242	12,867,094	3,906,000	14,025,000
Sand and gravel	31,518,123	28,480,350	29,300,000	27,000,000
Sodium sulfate	46,718	1,099,522	49,000	1,298,000
Stone	27,234,619	32,872,552(c)	28,109,000	35,110,000(c)
Sulphur (recovered elemental), long tons	115,692	3,143,606	127,300	3,458,000
Sulphur (Frasch process), long tons	3,766,882	105,128,170	3,993,000	111,436,000
Talc and soapstone	35,064	213,366	40,000	244,000
Undistributed: Abrasive stone, native asphalt, bromine, feldspar, graphite, lignite, magnesium compounds, magnesium chloride (for metal), mercury, pumicite, silver, stone (basalt), and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote (b))		43,022,765		45,102,000
TOTAL		$4,001,328,000		$4,266,358,000

(a) Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

(b) Value include with "Undistributed."

(c) Excludes certain stone value which is included with "Undistributed."

Oklahoma The total value of 1956 mineral production in Oklahoma amounted to $754,100,000—6 percent over the 1955 record value of $708,600,000. Mineral fuels accounted for 94 percent of this total 1956 value, nonmetals for 4 percent, and metals, 2 percent.

Twelve minerals of Oklahoma's 17 minerals, including mineral fuels, showed a gain in the 1956 value over that of 1955, according to the Bartlesville, Oklahoma office of the U. S. Bureau of Mines.

The estimated value of nonmetallic minerals produced in Oklahoma in 1956 was $32,300,000, the same as the record value established in 1955. Gains were shown for all nonmetallic minerals except clay, ce-

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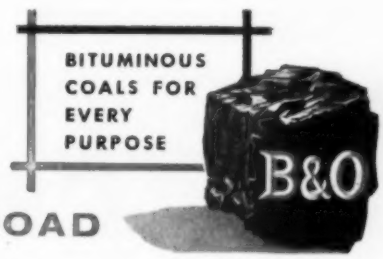

BALTIMORE & OHIO RAILROAD

ment, and native asphalt. The reduction in clay and cement production is attributed both to a decline in the construction field in the state and to work stoppage in one cement plant.

Asphalt (Native)—Output of native asphalt from Murray County in 1956 was less in both quantity and value than in 1955. Mining of a high-grade asphalt started near Sardis, Pushmataha County, Okla.

Cement—Cement production in 1956 in Oklahoma dropped 18 percent from 1955. This reduction resulted partly from a decrease in general construction in the state and partly from a 96-day work stoppage at the Dewey Portland Cement Co. plant, Washington County, which cost a production loss of 85,200 tons of cement.

Clays—Production of clays in Oklahoma in 1956 was estimated to be 700,000 tons, valued at $704,000, a drop of 3 percent in both tonnage and value compared with 1955.

Gypsum—Output of gypsum, all from Blaine County, increased again in 1956 in both production and value as it did in 1955. A survey of gypsum deposits made by the Oklahoma Geological Survey in the Weatherford-Clinton area of Custer County showed that sufficient quantities exist to meet the wall board and plaster requirements of the nation for the next 129 years at the current rate of consumption of 10,000,000 tons annually.

Lime—Lime production in 1956 increased over 1955 as demand for building materials continued.

Salt—Salt was reported from Beckham, Harmon, and Woods counties by three producers. The 1956 output and value was slightly greater than 1955 following the trend of the chemical industry.

Sand and Gravel—The output of sand and gravel operations in 1956 in Oklahoma was an estimated 6,300,000 tons, valued at $5,000,000. Production trend of this construction material has been increasing steadily during the 5-year period ending in 1956.

Stone—Stone output in Oklahoma attained a new record in 1956 when an estimated 10,800,000 tons, valued at $14,600,000, was produced. These figures represent an increase of 5 percent in quantity and 13 percent in value over 1955. The most important commodities in this group are crushed limestone, chat, and crushed granite.

Tripoli—The output and value of tripoli produced in Ottawa County approximated the 1955 figures.

Kansas Preliminary 1956 value of mineral production in Kansas (including mineral fuels) set a new high of $488,200,000 for the third straight year, an increase of 4 percent from the previous year, according to the Bureau of Mines, U. S. Department of the Interior. Petroleum, natural gas, natural-gas liquids, and coal accounted for 86 percent of the mineral production in Kansas for 1956; nonmetallic minerals, 12 percent; and metals, 2 percent.

Nonmetallic Minerals — Nonmetallic minerals produced in Kansas were cement, clay, gypsum, pumicite, salt, stone, and sand and gravel. All nonmetallic mineral production was up during 1956. Stone production was the largest for nonmetallic minerals, but cement exceeded stone in value.

Construction Materials — Tight money and increased costs that sent house construction downward was offset by the increase in commercial construction and especially by public works construction.

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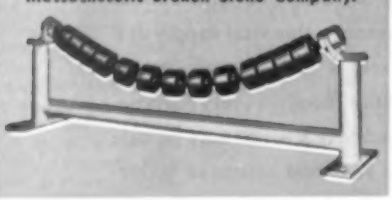

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"600 tons per hour 100% passing 1½" screen with our Universal 4650 Impact Master"

Says Mr. James P. McDonnough, president, McDonnough Brothers, Inc.. San Antonio, Texas

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"We have, so far, produced 600 tons per hour of 100% crush passing 1½" screen with our Universal 4650 Impact Master. We have not yet come close to the capacity limits of our new plant, but are confident that we are equipped to crush at least 800 tons per hour.

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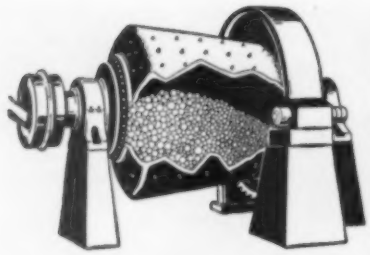

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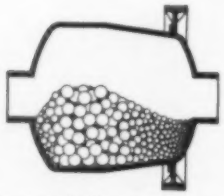
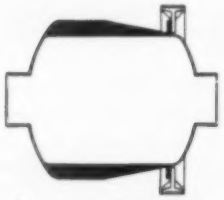


Correct ball segregation—large balls at feed end.



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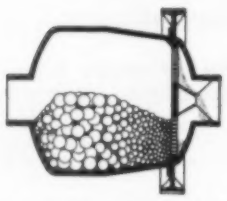

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Cement—Cement producers in Kansas operated above capacity during 1956. The cement industry was marked with modernizations and expansions. Manufacture of natural cement is operating at capacity.

Clay—Clay output increased 15

Mineral Production in Oklahoma, 1955-56 (a)

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	1956 Short tons (unless otherwise stated)	1956 Value
Clays	724,156	726,856	700,000	704,000
Coal	2,163,536	8,037,932	1,960,000	—(c)—
Lead (recoverable content, etc.)	14,126	4,215,198	12,800	4,096,000
Natural gas million cu. ft.	614,976,000	45,508,000	662,000	48,988,000
Natural gas liquids:				
Natural gasoline & cycle products. thousand gal.	504,692	28,770,000	526,768	28,530,000
LP-gases thousand gal.	512,320	14,297,000	621,520	20,989,000
Petroleum (crude) thousand 42 gal. bbl.	202,817	565,280,000	215,640	601,647,000
Sand and gravel	6,293,798	4,785,786	6,316,000	5,025,000
Stone	10,245,479	12,972,150	10,796,925	14,628,000
Zinc (recoverable content, etc.	41,543,	10,219,578	29,950	8,086,500
Undistributed: Native asphalt, cement, gypsum, lime salt (common), sulphur (recovered), tripoli, bentonite, coal (1956)		15,525,248		22,884,100
Total		708,592,035(d)		754,122,600(d)

(a) Production as measured by mine shipments or mine sales (including consumption by producers), except that fuels and gypsum are strictly production.
(b) Preliminary
(c) Included in "Undistributed."
(d) Value adjusted to avoid duplication of clay and limestone used in manufacture of lime and cement.

Mineral Production in Kansas, 1955-56 (a)

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	1956 Short tons (unless otherwise stated)	1956 Value
Cement (b) .. 376 lb. bbl.	9,071,747	$ 24,520,533	9,975,000	$ 26,933,000
Cement (masonry) 376-lb. bbl.	382,523	1,333,504	420,393	1,476,000
Coal	724,282(c)	—(c)—	960,000(c)	—(c)—
Helium cu. ft.	42,750,000	662,619	45,035,000	698,000
Lead (recoverable content of ores, etc.)	5,498	1,640,603	7,100	2,272,000
Natural gas million cu. ft.	471,041	52,286,000	470,000	52,278,000
Natural-gas liquids:				
Gasoline and cycle products-thousand gal.	118,599	6,318,000	122,612	6,618,000
LP-gases ....thousand gal.	92,596	2,643,000	95,687	2,769,000
Petroleum (crude)-thousand 42-gal. bbl.	121,669	341,230,000	124,479	351,031,000
Salt	910,866	8,432,325	992,800	9,191,000
Sand and gravel	10,664,986	6,909,666	10,985,000	7,255,000
Stone	12,470,616(d)	15,887,269(d)	13,541,000	16,651,000
Zinc (recoverable content of ores, etc.)	27,611	6,792,306	27,200	7,344,000
Undistributed: Clay, coal, diatomaceous marl, gypsum (crude), natural cement, pumicite, sandstone (dimension)		5,773,449		7,434,000
TOTAL		$471,392,554(e)		$488,227,000(e)

(a) Production as measured by mine shipments or mine sales (including consumption by producers), except that fuels and gypsum are strictly production.
(c) Preliminary figures, value for which is included with "Undistributed."
(d) Excludes certain stone, value for which is included with "Undistributed."
(e) Total has been adjusted to eliminate duplication of value of clays and stone.

percent from 1955. Miscellaneous clay accounted for the major portion of the clay produced. Fireclay production increased and the major portion of this output went for manufacture of tile and sewer pipe. Some fireclay was made into insulating brick by individual companies for use in their plants.

Gypsum—Two producers in Marshall and Barber counties increased production of gypsum in 1956.

Salt—The salt industry had its beginning in Kansas in 1859 with three counties accounting for the salt production. In 1956 Wilson was added to Ellsworth, Reno and Rice counties as salt producers.

Rock salt constituted approximately half of the total salt production in Kansas, though the value of evaporated salt was about twice as great as the value of rock salt. The yield of salt increased 9 percent in 1956.

Pumicite (Volcanic Ash)—Pumicite was mined in Lincoln and Meade Counties during 1956. Tonnage mined approximated that of the previous year.

Sand and Gravel — Continued high rate of construction and road building pushed recovered tonnage and value 3 and 5 percent, respectively, above 1955. Sand and gravel was produced in over 70 counties, with 148 producers reporting. Commercial output was approximately eight times the output of government and contractors. Sedgewick County led in the reported production. Completion of Kansas Turnpike should stabilize the supply.

Stone—Construction of the Kansas Turnpike was highlighted by the use of portable crushing and screening plants. Production of stone gained 8 percent during 1956, and limestone recorded the largest quantity of rock aggregate followed closely by miscellaneous stone. Most of the limestone was used in concrete, road metal, and riprap. Miscellaneous crushed stone was consumed for railroad ballast. Diatomaceous marl was processed for paint fillers.

Ohio Production in Ohio increased 8 percent, from $342,131,000 in 1955 to $370,034,000 in 1956. Increased output of fuels was the primary factor in the upswing in state production as coal output increased 8 percent with an accompanying increase in value. The value of petroleum, natural gas, and natural gas liquid production also increased 54 percent, 11 percent, and 17 percent, respectively, over 1955.

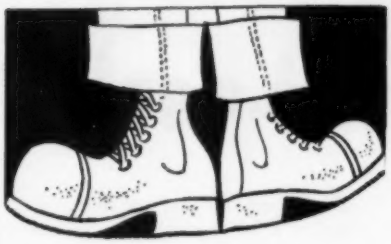
Other significant changes in Ohio production were increases in value of sand and gravel (9 percent) and peat (11 percent), and decreases in value of stone (9 percent) and salt (7 percent). The value of output of the remainder of state minerals changed slightly from 1955.

Heavy construction awards chalk up $330,100,000 for the week ended June 27, and the cumulative total for the first six months of 1957 is now given as $9,445,500,000, 17 per cent below the 1956 half-year volume. For the same period in 1956 contracts were running 21 percent above 1955.

Mineral Production in Ohio, 1955-56(a)

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	Preliminary 1956 Short tons (unless otherwise stated)	Preliminary 1956 Value
Cement (376-lb. bbl.)	14,913,719	$ 42,965,924	15,200,000	$ 43,800,000
Clay	6,297,413	15,677,389	5,983,000	15,051,000
Coal	37,869,791 (b)	133,637,384	40,930,000	—(c)—
Lime	3,038,949	39,393,634	3,030,000	39,269,000
Natural gas (million cu. ft.)	33,756	7,595,000	37,200	8,400,000
Peat	22,484	249,427	25,000	276,000
Petroleum (crude), thousand 42-gal. bbl.	4,317(b)	12,480,000(b)	4,800	19,200,000
Sand and gravel	27,906,047	31,995,215	30,140,000	34,900,000
Stone	33,272,566	49,841,246	29,380,000	45,273,000
Undistributed: Abrasive stones, gypsum, natural gasoline, salt, natural salines, and recovered sulphur		17,633,216		172,154,000
TOTAL		$342,131,000(d)		$370,034,000d

(a) Production as measured by mine shipments, sales or marketable production (including consumption byproducers).
(b) Preliminary figure, subject to revision.
(c) Included with "Undistributed."
(d) Totals have been adjusted to avoid duplication of value of limestone for cement and lime which are included in the value of cement and lime.



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Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

During my 30 years of active law practice I have known many intelligent men who amassed fortunes through their keen business judgment and ability. However, many of them lost their fortunes because of defective legal procedure.

For example, in a recent higher court case the proprietor of a business was held liable in $100,000 damages for injuries to an employee because he failed to abide by a well known state law. In another recent case a manufacturer was held liable for $136,000 to a person injured while using the manufacturer's emery wheel, which was not made according to standards previously established by the industry.

In another case the owner of a merchandising business was held liable in $87,575 damages for injuries to a customer caused by the negligence of an inexperienced workman. For illustration, in *Johnson v. Long*, 180 Pac. (2d) 21, it was shown that one Johnson was awarded $87,575 damages for injuries received when an overhead door fell on him. He proved that the employee who installed the door did not securely weld the ends of the cable to prevent it from unwinding. The employee testified that he did not weld the cable because he "thought" a nut would be welded to the end of the cable by another workman.

The lower court granted Johnson $87,575 damages. The case was appealed, but the higher court approved the verdict, and said:

"The verdict is undoubtedly high. Nevertheless, it is not the function of a reviewing court to interfere with a jury's award of damages unless it is so grossly disproportionate to any reasonable limit of compensation warranted by the facts that it shocks the court's sense of justice and raises a presumption that it was the result of passion and prejudice."

What Is Accidental Injury?

Here is another query: "When is an employee entitled to receive compensation for an 'accidental' injury, if the employee also was previously afflicted?"

Recently a higher court held that an "accidental" injury arises from any act of the employee which may have caused the injury, irrespective of his prior afflictions or disease.

For illustration, in *B. vs. M.*, 76 N. W. (2d) 851, it was shown that one B. was employed as a dump-truck operator. Although he had a rheumatic heart condition, he worked regularly at manual labor. One day he drove his truck up to a crane to be loaded with gravel. After he received his load he drove a short distance away, stopped, and climbed upon his load to level it. He jumped off the load onto the ground and rolled under his truck. Another employee saw him and found him groaning and trying to get up. An ambulance was called, and he was taken immediately to a hospital. He was found to be suffering from a cerebral thrombosis or embolism. His right side became totally paralyzed, and he was never able to talk or work again. He died about a year later.

In subsequent litigation the higher court awarded B.'s widow compensation specified for accidental injuries by the State Workmen's Compensation and said:

"Is the injury an unexpected result of ordinary work, or is it the ordinary result of unexpected work?"

For comparison, see *Mutual Accident Association v. Barry*, U.S. 100. This was a suit in which it was proved that the employee jumped from a platform, landing heavily on his heels. Later the employee stated that he believed he was severely injured when he jumped from the platform; but the higher court refused to award compensation.

When Seller Is Liable

Last month a higher court rendered an important decision which clearly answers a legal question often asked by sellers of nonmetallic products. This legal question is whether or not a seller may be compelled by a buyer to fulfill the exact terms of a written contract to deliver merchandise at the price specified in the contract, although by so doing the seller will lose money.

For example, in *San Gabriel Valley Ready-Mixt v. Casillas*, 298 Pac. (2d) 77, the testimony showed facts,

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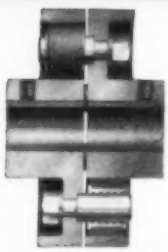

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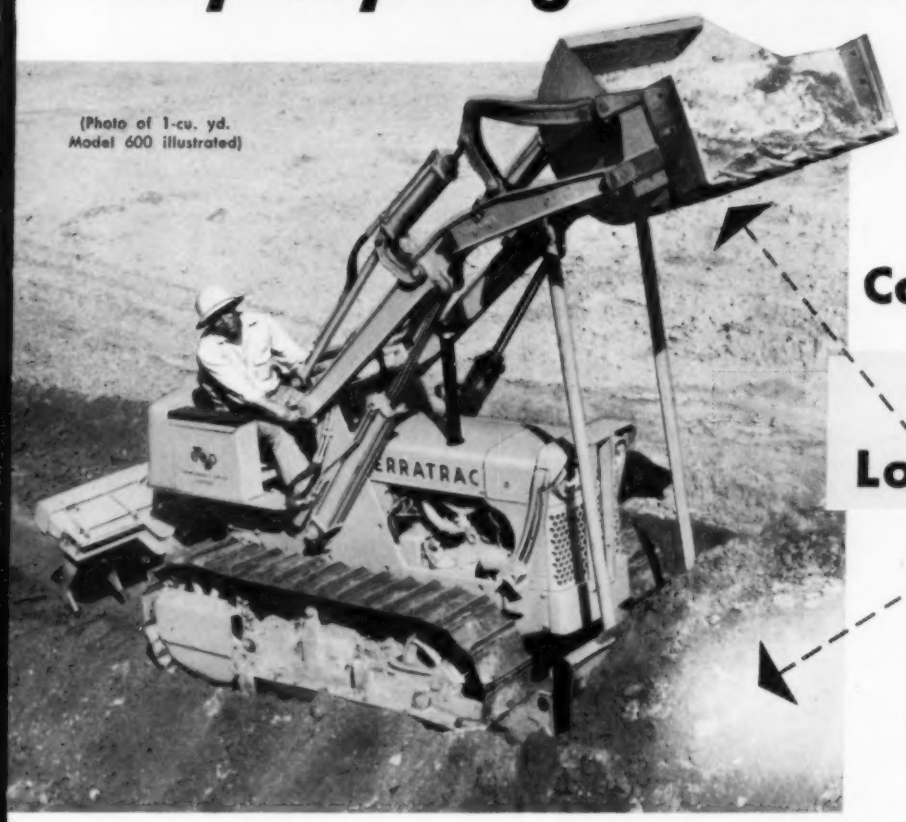
WESTFIELD, NEW YORK
Also manufacturers of Ajax vibrating conveyors, screens and packers.

Why buy 2 rigs...when 1 will do?



New Case® TerraTrac®

"2-in-1" Loader-Dozer

Saves investment!
Cuts operating cost!

If you need a front-end loader, as well as a dozer — but don't have full-time work for *both* — there's no longer any need to buy *two* machines and hire *two* separate operators to run them.

Now, for only a few dollars more than the cost of a *single*-purpose rig, you can get a *multi*-purpose Case TerraTrac crawler, with combination loader and dozer. This gives you the *versatility* of two highly efficient work-tools, with the *economy* of one tractor, one hydraulic system, and one operator.

With optional *bulldozer or angledozer*, you can clear land, build access roads, do light stripping, filling, etc. Then you simply pull four pins . . . detach dozer and lift arms . . . and you're ready in 5 minutes to work the *loader* . . . for loading trucks and hoppers, stockpiling, materials-handling, clean-up, and many other jobs.

Capacities up to 2 cu. yds.

Case TerraTrac combination loader-dozer units are available in 10 gasoline and diesel-powered models — *from 42 to 100 HP, with ⅝ to 2-cu. yd. buckets.* Largest models feature torque-converter drive and exclusive counter-rotating Terramatic transmission, with instant power-shift, and power-steering, which give you much higher working speeds and greater ease of maneuverability than any conventional crawler tractor. These larger Case TerraTrac units also give you the important advantage of torsion-bar track suspension and automatic track roller lubrication, which cuts greasing time from once a day to a few times a year. Mail coupon today for complete facts on sizes best suited to your needs.

CASE

1st in quality
for over 100 years

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Send free catalog on Case TerraTrac loader-dozer units checked.

☐ 2 yd. ☐ 1½ yd. ☐ 1 yd. ☐ ¾ yd. ☐ ⅝ yd.

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TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs on a great variety of Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

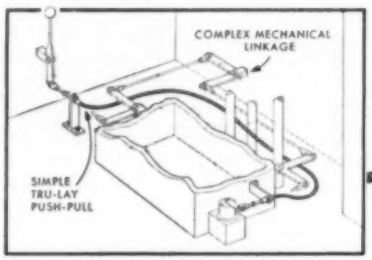
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

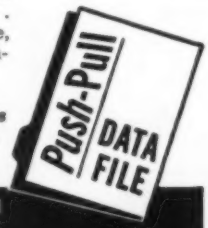
Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.



Our ***DATA FILE*** *will answer your further questions*
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as follows: The San Gabriel Valley Ready-Mixt and a contractor, named Casillas, signed a written contract by which the latter agreed to buy concrete for the construction of 307 houses, the quantity to be approximately 6,140 cu. yd. at $9.45 per yard.

Later a salesman for the company told Casillas there would be a shortage of cement and that his firm would be unable to meet Casillas' demands except with imported cement, also that the San Gabriel Valley Ready-Mixt could not continue to furnish the concrete at the price specified in the written contract. Casillas was very angry and began buying concrete from another company. Later, however, he began purchasing concrete from the San Gabriel Valley Ready-Mixt and orally agreed to pay $11.52 per cu. yd. for it.

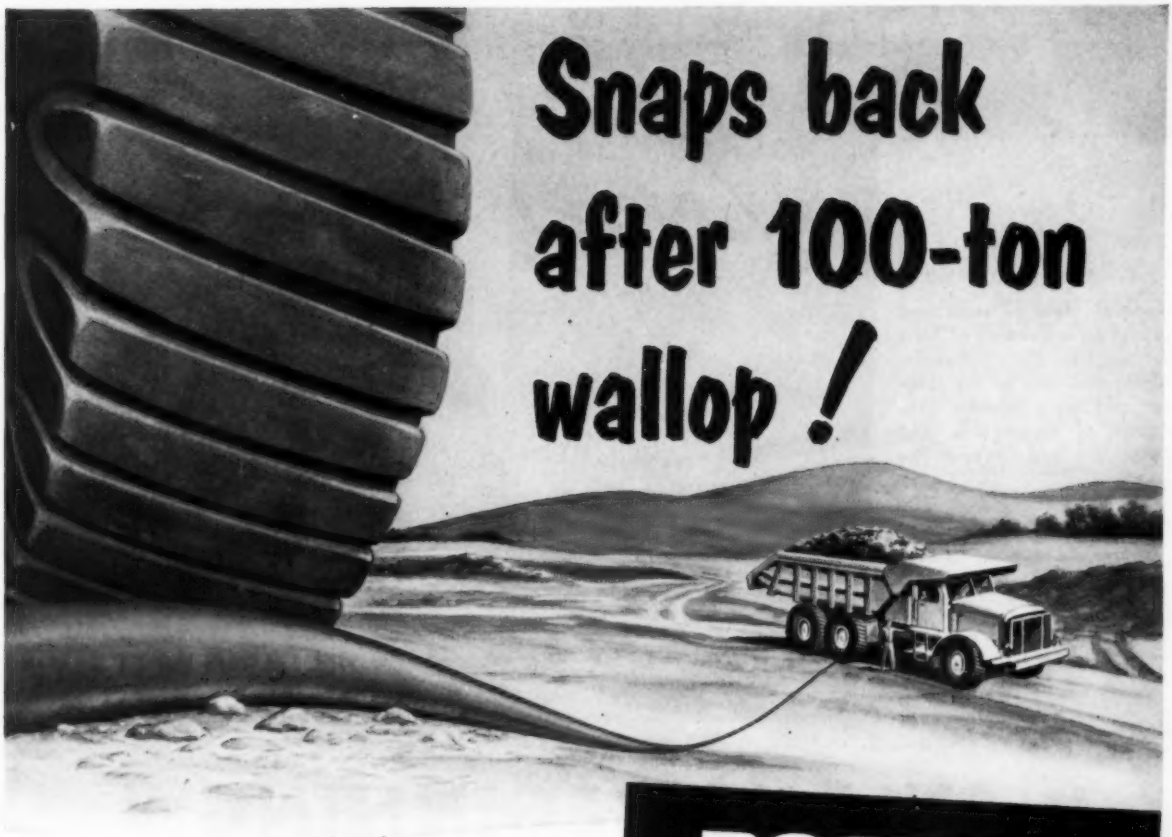
At the termination of his job Casillas refused to pay the San Gabriel Valley Ready-Mixt $11.52 per yard for the delivered concrete, contending that he had not abandoned the written contract or released the seller from it, and that therefore his oral agreement to pay the higher price was without consideration.

Nevertheless, the higher court held that Casillas must pay the San Gabriel Valley Ready-Mixt $2,924.67, the difference between the delivered concrete at the oral agreement price of $11.25 per yard and the written contract agreement price of $9.45 per yard. The court said:

"The question was whether each of the parties intended by entering into the oral new arrangement to release the other and to be released from the written contract."

This court went on to explain that Casillas could have forced the San Gabriel Valley Ready-Mixt to supply the required concrete under the written contract at $9.45 per yard. This court said that the law will not permit a seller to avoid his obligation to deliver merchandise upon the sole ground that due to fluctuating supply and prices he would lose money by fulfilling them. In other words, if the prices had gone below the contract price, the seller would still have been bound by his contract.

But when Casillas began buying concrete from another seller and did not demand that San Gabriel Valley Ready-Mixt deliver concrete at the price of $9.45 per cu. yd. as specified in the written contract, and when later Casillas orally agreed to pay San Gabriel Valley Ready-Mixt $11.52 per cu. yd. for future deliveries, the court held that this testi-



Snaps back after 100-ton wallop!

BOSTON *concord yellow jack* AIR HOSE

This is the hose built to take the most brutal treatment. So strong it snaps back even after being battered by a loaded Model LLD Euclid — a gross weight of 203,300 pounds!

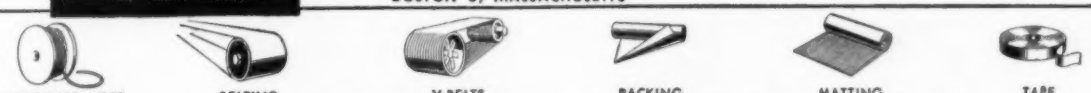
When you consider that 45% of air hose failure is caused by *external* conditions, Boston Concord Yellow Jack is definitely the air hose to choose for your toughest jobs. It has the stamina to handle repeated rugged impact . . . the strength to withstand the highest internal pressures.

Boston Concord Yellow Jack's bright yellow cover makes it easy to identify.

Whatever your hose needs, there's a BOSTON Hose for you . . . and a BOSTON man nearby to help you solve your problems.

BOSTON

BOSTON WOVEN HOSE & RUBBER CO.
BOSTON 3, MASSACHUSETTS



First Thomas

General view of sand and gravel pit operation of John B. Lagarde, Inc., Anniston, Alabama—one of the largest and more modern producers of aggregates and concrete products in the South.

BORN - 1948

IN THE BEGINNING

This is the story of the birth and life of the first Thomas Durable Dredge Pump. It was installed late in 1948 in the aggregates plant of John B. Lagarde, Inc., Anniston, Alabama.

It was new and different in design and made of Genuine Thomas NI-HARD—a radical departure from the conventional Manganese Steel sand and gravel pump which it replaced. This original Thomas Pump now 8½ years old is still in use because the Lagarde organization has found it to be far more DURABLE, more EFFICIENT and more ECONOMICAL in operation. It is pushing approximately 175 tons of saleable sand and gravel per hour through an 8″ line, against a static head of 90 feet and a total head of 140 feet.

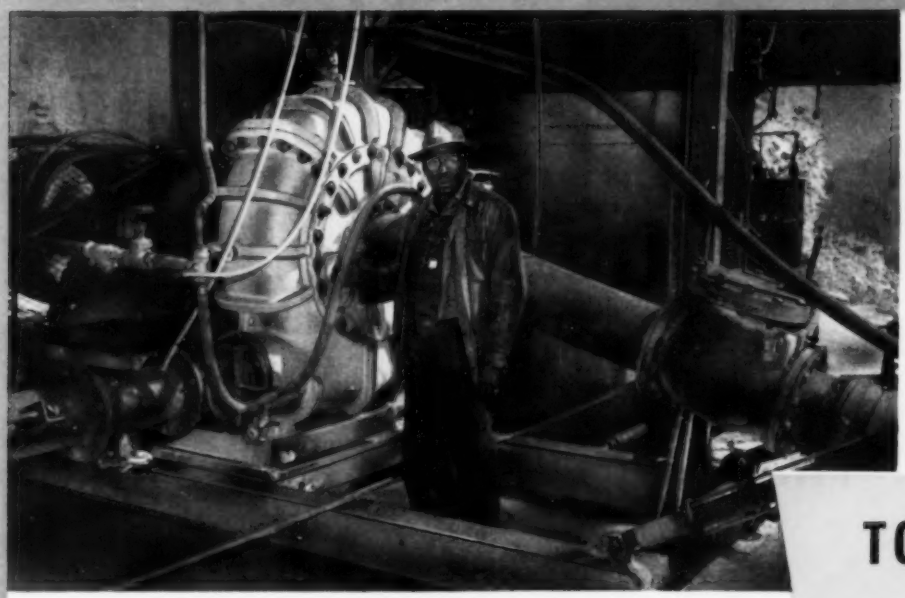
Designed specifically to be made of this MODERN, LONG-LIVED, ABRASION RESISTANT MATERIAL, this Thomas Pump's extra long life and minimum need of repairs has resulted in 8½ years of service which Lagarde officials say no other pump has ever equalled in their plant. The Manganese Pump is still idle simply because it can't compete cost-wise with the more modern and more efficient Thomas Pump.

The four Lagarde Company men shown at the right were present on this momentous occasion—the birth and development of this badly needed, more modern and more efficient and durable pumping equipment. In fact they made many suggestions and were very helpful in perfecting it. Today in 1957 they are naturally proud to have had a hand in its development for there are now several hundred Thomas Pumps making similar records for efficiency, long life and economy in all sections of the United States.

Now read what they have to say after 8½ years experience with the first Thomas Pump!

THOMAS FOUNDRIES, INC., . .

Durable Dredge Pump



PUMP OPERATOR, Robert "Coke" Brockman (left): "I have operated three different makes of pumps during my many years with John B. Lagarde, Inc. I would rather run pumps than work on 'em — that's what I like about the Thomas."

TODAY - 1957

WHAT THEY SAY NOW

VICE PRESIDENT AND GENERAL MANAGER, J. N. "Jimmy" Gann: "From almost every state in the United States, we have had many sand and gravel operators come to see our unusual operations in which we hydraulic sand and gravel into a sump and then pump it out of the pit. In highly recommending Thomas Pumps, we feel we have done these visitors a favor and we understand many of them have since installed Thomas Pumps."

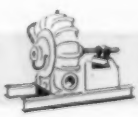
PLANT FOREMAN, R. J. "Dick" Medders (right): "If all of our sand plant equipment was as durable and dependable as our Thomas Pump, my job would be a bed of roses."

SUPERINTENDENT, Arthur Sword (left): "Even after 8½ years, we continue to marvel at the extra long life of our Thomas Pump. But when parts finally are needed, Thomas service is excellent. We have NEVER BEEN DELAYED OR DOWN due to failure to receive parts and service."

THE INEVITABLE CONCLUSION

YOU CANNOT BUY AT ANY PRICE, A MORE DURABLE PUMP FOR SAND AND GRAVEL THAN A THOMAS—YOU CANNOT BUY ANOTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY.

P. O. Box 1111—BIRMINGHAM, ALABAMA



mony showed that Casillas had "abandoned" the written contract. The court said:

"The defendent (contractor) does not and could not deny that he agreed to pay the increased price. . . . If there was a mutual understanding that defendant (Casillas) could and would buy his concrete elsewhere and that neither party would demand further performance of the contract by the other, this effected an abandonment of the contract."

When to Employ Guard

Many times in the past I have received letters asking whether it is legally necessary to employ a guard to keep children off dangerous premises. Recently I located a higher court decision which holds: If the premises are close to a public playground or where children are accustomed to play, a guard should be employed.

See the leading case of *Collins v. Chica,* 52 N. E. (2d) 473. In this case, it was shown that a contractor began the installation of a new water main and dug an excavation approximately 30 in. wide and 6 ft. deep in close proximity to a public playground.

One day while a boy was playing in the excavation, a lighted flare tipped over spilling kerosene on him, and he was severely burned. He sued the contractor for $20,000 damages. The higher court held the boy entitled to a full recovery and said:

"Because of the close proximity of the public playground, a watchman should have been extremely vigilant in the performance of his duty to keep the children away from the flares and ditches."

This court went on to explain that if these premises had not been in close proximity to a public playground, the contractor would not have been liable for injuries to the boy, irrespective of whether a guard was employed to warn children of the dangers.

Cannot Solicit Former Customers

An official of a concrete products company presented an interesting legal question, as follows: "If my salesman resigns, or is discharged, may he take employment with my competitor and act as a salesman for him?"

Answer: If the salesman does not *directly* solicit your customers he may; otherwise, the salesman is illegally soliciting business.

For example, in *Wallich Laboratories v. Koren,* 181 Pac. (2d) 682, it was shown that an employer named Willis employed one Koren as a salesman. Koren was supplied with a list of patrons and addresses within the specified territory and other valuable information relative to them. Koren continued to solicit customers for Willis for four years, and then the employment was terminated. Seven months later Koren commenced to solicit for another corporation and to sell merchandise to customers on the routes he formerly traveled for Willis.

Willis filed suit and asked the court to grant an injunction to prevent Koren from selling merchandise and supplies to any of these persons who were customers of Willis in the territory previously traveled by Koren. The higher court granted the injunction and also held Koren liable in damages to Willis.

New Ordinance Not Effective

According to a recent higher court, a new city ordinance is not effective in stopping operations of an old and established sand and gravel plant.

For illustration, in *Town of Somers v. Camarco Sand and Gravel Company,* 127 N. E. (2d) 327, the testimony showed facts, as follows: The Camarco Sand and Gravel Company had for many years operated a plant in an outlying area of a city. Later

More GIANT Sizes! More GIANT Tread Designs!
More GIANT Savings! . . . Now at

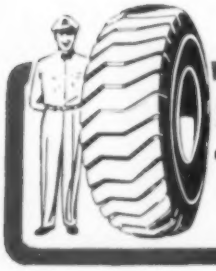
SOUTHERN TIRE COMPANY

Probably more dirt and rock is hauled on Southern Tire retreads than on any other retreaded tires. That's because more and more contractors and heavy equipment operators are discovering the superior quality and economy of Southern Tire retreads.

Southern Tire offers not only the country's most complete range of tire sizes and tread designs, but also the world's finest retreading facilities — three-sectional molds that mean no buffing to breaker strips regardless of growth.

These facilities and use of finest tread rubber, plus Southern Tire's long experience, assure better quality with greater economy. Call your tire dealer now for facts about how Southern Tire retreads can save you as much as 40% of the price of new tires yet give you guaranteed new tire service.

All sizes — from 1100 x 24 to 33.5 x 33



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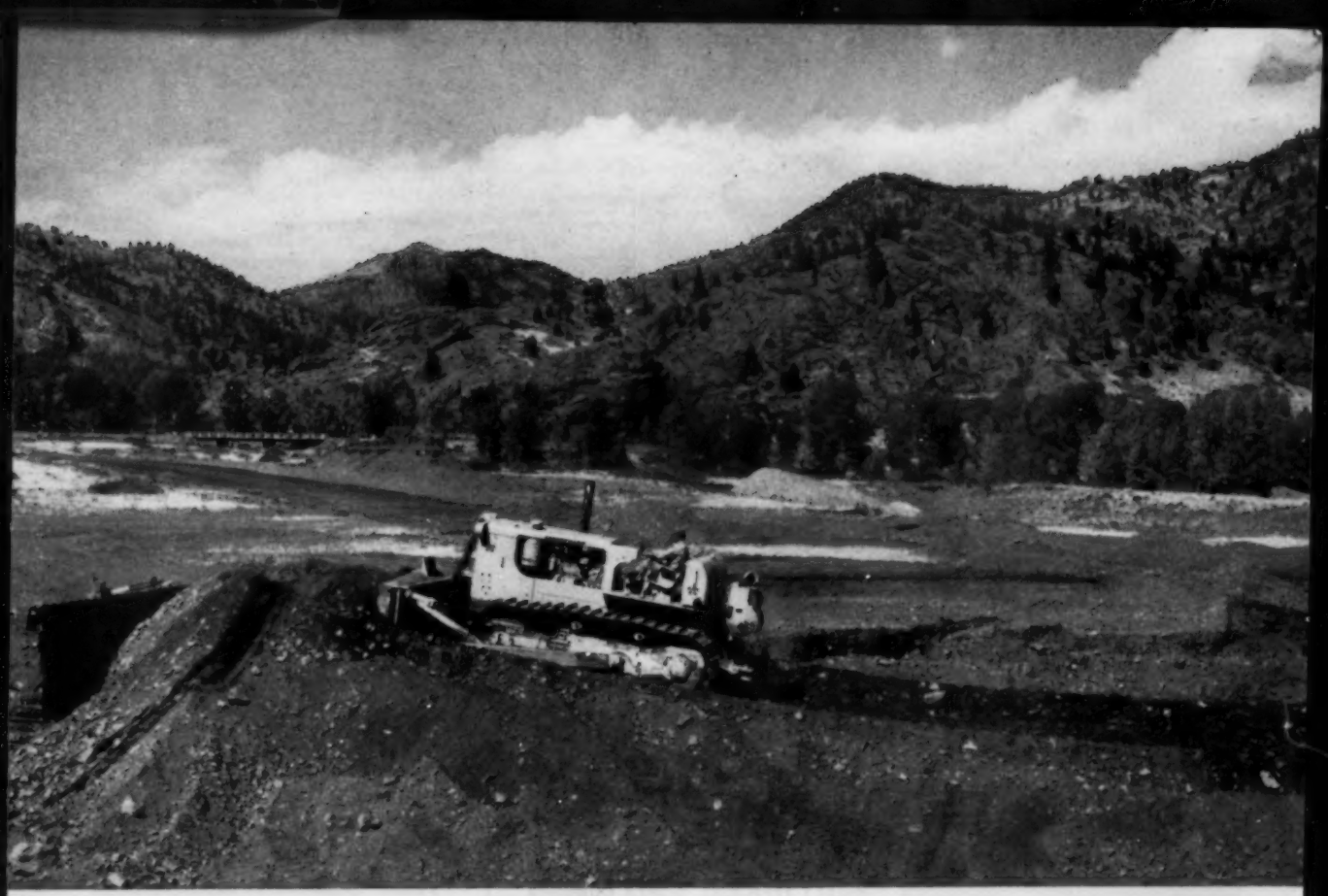


"We can't afford anything but CAT*-built machines"

Ask Oscar J. Mortensen, owner of a gravel pit near Cascade, Montana, why he has Caterpillar-built equipment and you'll get this plain answer:

"We've used Caterpillar-built equipment since 1940. We've had very little trouble on repairs and costs are lower than on any other equipment we could use. If they weren't, we wouldn't own it. We can't *afford* anything but Cat-built machines."

How about service? "We get service and parts in a hurry," Mr. Mortensen says, "and the parts aren't out of line on price either."

A Caterpillar D9 Tractor with No. 9S Bulldozer is shown above at the Mortensen pit. Here it is 'dozing raw gravel to the conveyor of a crushing plant that produces 1,000 cu. yd. of ½ to 2 inch track ballast per 8-hour day.

Pit owners everywhere are enthusiastic about the giant D9 Tractor. In repeated tests where accurate records have been kept, one D9 has outworked *two* bulldozers of the next size. Blade loads average 12 cu. yd. and are handled at higher speeds.

The D9 is heavy (35 tons with the No. 9S Blade) and powerful (320 HP at the flywheel)—yet one of the easiest of all tractors to operate because of its power-boosted controls and excellent visibility. Maintenance is low, too. The D9 is available with either torque converter or direct drive with oil clutch.

Everything about the D9 adds up to one thing: efficient production. Get all the facts from your Caterpillar Dealer; then try out the D9 in your pit. After you buy, depend on him for prompt service, parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

You pay less for this stronger thread for bags

"SUPER CORDURA" SEWING THREAD reduces bag breakage resulting from rugged handling, because seams are much stronger.

"SUPER CORDURA" can be sewn with smaller needles, preventing material losses caused by sifting.

HIGHLY EFFICIENT "SUPER CORDURA" REG. U. S. PAT. OFF. REDUCES BAG AND CLOSING COSTS

GREATER seam strength, increased sewing efficiency, lower cost—these are the advantages of sewing bags with Du Pont "Super Cordura"* high tenacity rayon.

Because "Super Cordura" is far stronger than ordinary-fiber threads, danger of seam breakage is minimized—drop tests prove it. And because sewing with "Super Cordura" is more efficient, you save money in your closing operations. There are less breaks during closing; one thread does most jobs, reducing thread inventory.

Consider the advantages of bags sewn with Du Pont "Super Cordura" the next time you order multiwalls . . . and order it for use in closing, too.

E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Department, Wilmington 98, Delaware.

**"Super Cordura" is Du Pont's registered trademark for its high tenacity rayon yarns.*

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living . . . through Chemistry

THREAD OF "SUPER CORDURA"... easier to sew ... costs less than conventional thread . . . extra-strong

the city enacted a new ordinance which prohibited use of this land for the operation of this plant. The higher court held the ordinance invalid and said:

"Under the facts and circumstances revealed, the zoning ordinance is unconstitutional insofar as they apply to the defendants (Camarco Sand and Gravel Company)."

This court went on to explain that such an ordinance is unconstitutional in that it deprives the Camarco Sand and Gravel Company of a vested right. In other words, the provisions of the zoning ordinance was invalid, as applied to Camarco Sand and Gravel Company, which had a substantial investment in its business. In this respect, the higher court said:

"The extent of the reasonable exercise of the police powers varies directly with the degree of the density of the population in the city, town, or village involved. An ordinance which might be considered as reasonable if enacted in New York City, could be considered as unreasonable if enacted in a smaller political subdivision. A definition of reasonableness can not be made for all occasions, and must, of necessity, be considered anew in the light of each problem presented."

City Ordinance Restricts Use of Land

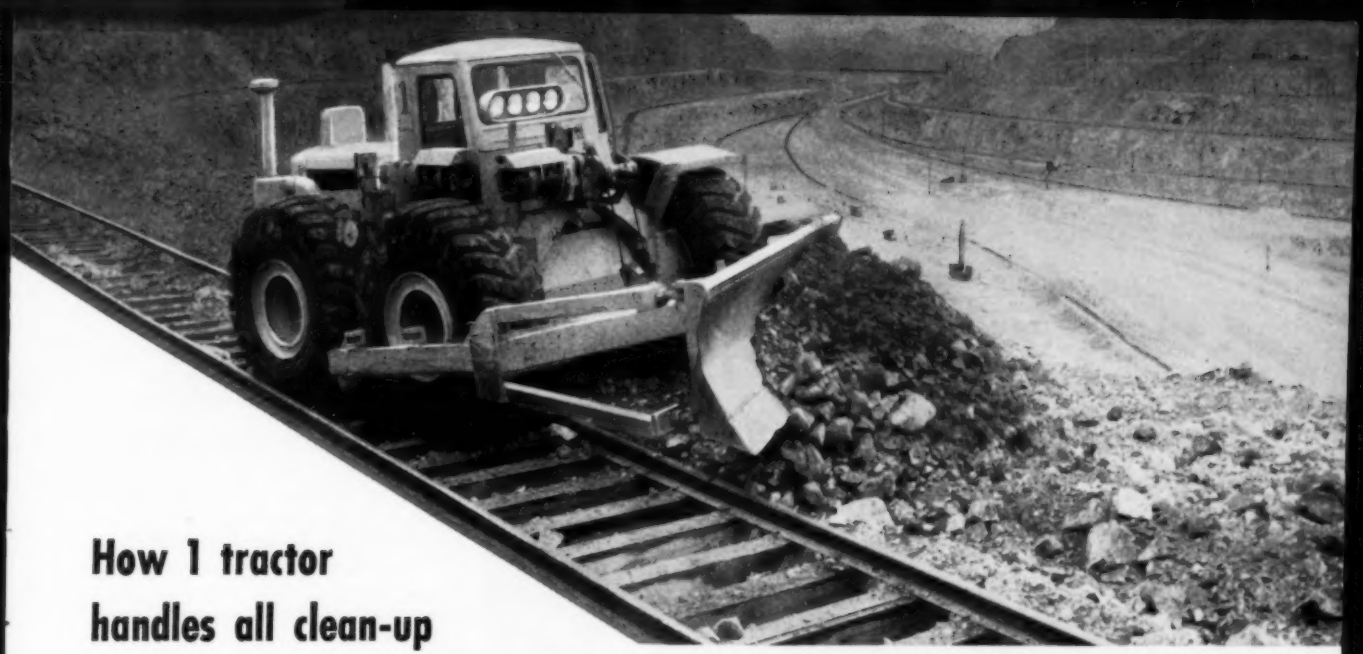
Last month a higher court rendered an important decision which answers a common legal question: "Recently the city officials passed an ordinance which restricts this area in which our business is located exclusively for residences. Does this mean that we cannot take sand and gravel from our land?"

The answer is: Yes, this is so, unless you can prove that your company was taking sand and gravel from the land before the restrictive ordinance was enacted.

For illustration, in *Town of Lexington v. Simeone*, 134 N. E. (2d) 123, it was shown that a city zoning ordinance restricted an area for residences. Some time after the passage of this ordinance a company brought on its land in this area heavy equipment, including a steam shovel and trucks, which it used to strip, excavate, remove, and sell large quantities of loam, gravel, and other earth.

In subsequent litigation the higher court granted an injunction against the company removing these materials from its land in the restricted area, and said:

"Here it is reasonable to think that the interests of the public may



How 1 tractor handles all clean-up around fleet of scattered shovels

At this large open-pit copper mine in Arizona, copper is produced from huge tonnages of rock and ore that are mined each day. Equipped with Angledozer and tilt mechanism, 210 hp Tournatractor makes quick work of clearing shovel-spillage from railroad tracks.

A large open-pit copper mine in Arizona uses only one tractor for all clean-up around their widely scattered production shovels. It is the 210 hp rubber-tired LeTourneau-Westinghouse Tournatractor®. Here's how this 17 mph tractor operates during a typical 8 hour day:

Averages 10 min. per shovel

When the 6-yd. shovels have completed loading a string of ten to twelve 84-ton capacity rail-cars, Tournatractor drives in and goes to work. Straddling the rails, this rubber-tired tractor efficiently dozes shovel spillage off tracks with its Angledozer* blade. At each shovel, speedy Tournatractor cleans-up loading area and railroad track in about 10 minutes!

Takes shortest route to next location

When each assignment is finished, Tournatractor operator just flips instant-shift lever and he's on his way to the next shovel. There are no delays for crawling or load-and-haul to new location. A mile is only a couple minutes away! Tournatractor always takes the shortest, fastest route to the next work location . . . often "runs" down steep "shot" banks to lower benches. Big, low-pressure tires do not damage air-drill hose lines, RR tracks, ties, switches, or haul road surfacing.

"You can't beat Tournatractor"

Handling all clean-up work for the shovels . . . plus completing numerous scattered maintenance jobs during his 8 hour shift . . . Tournatractor operator said, "You can't beat this tractor for clean-up work. This is the place for rubber . . . I can move around faster than a pick-up truck on some of our benches."

For more information

If you use several crawler-tractors for clean-up at your pit, plant, and stockpiles, investigate how Tournatractor's power . . . traction . . . speed . . . and "go-anywhere" mobility can pay off for you. We'll be glad to demonstrate Tournatractor at your pit . . . let you judge for yourself.

*Trademark CT-1482-M-1

Go-anywhere Tournatractor "runs" down a "shot" bank to shorten travel time between shovels. With big, multi-disc air brakes — totaling 3,762 sq. in. of brake surface — operator has sure, safe control at all times.

Crossing tracks, Tournatractor's big, low-pressure tires deflect to prevent damage. They do not loosen rails, damage ties or switches.

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

be advanced by the inclusion of the defendant's land in an area zoned for single family dwellings, and that it is likewise reasonable to enjoin the removal therefrom of gravel and other material whether in the conduct of a business or not. . . With respect to the contention that the zoning by-law is unconstitutional or invalid as applied to the defendant's land, the test is whether its provisions are clearly arbitrary and unreasonable, having no substantial relation to the public health, safety, morals, or general welfare."

Too Long Period

An official of a quarry corporation asked whether or not an employee who has tuberculosis can receive compensation from an employer for whom he worked several years previously. According to a recent higher court, the answer is no.

For example, the *Ralph's Case*, 117 N. E. (2d) 142, the testimony showed facts, as follows: In 1951 an employee, named Ralph, aged 64 years, died at a sanatorium where he had been a patient for one year. The cause of death stated in the death certificate was "tuberculosis of the lungs." For over 30 years prior to 1939 Ralph had worked in granite quarries and during part of that time had been employed as a stonecutter.

In subsequent litigation the higher court held that Ralph's dependents could not recover compensation under the State Workmen's Compensation Act because Ralph had not been employed in quarry work for 12 years prior to his death. This court said:

"There was no evidence that would support the finding that the employee (Ralph) probably had tuberculosis during the periods of his employment. The time of the onset of this disease was clearly not a matter which the board could determine from its own knowledge."

What Is Total Disability?

Considerable discussion has arisen from time to time over the legal question: When is an injured employee totally disabled and entitled to receive compensation under the State Workmen's Compensation Act on this basis?

Last month a higher court held that "total disability" may exist when, under all of the facts and circumstances, the jury determines that the employee is unable by reason of his accidental injury to obtain and retain gainful employment.

For example, in *S. vs. L.C. Sand and Gravel Company*, 292 Pac. (2d) 93, the testimony showed facts, as follows: An employee of a sand and gravel company was seriously injured. The extent of his disability was established by the expert testimony of orthopedic surgeons. Also, the employee claimed his inability to work at his trade as a welder or any other work except such as did not require physical exertion. During the trial an orthopedic surgeon testified that he had performed surgery on the back of the employee because of a floating disc and made a fusion of two of the vertebrae.

The higher court awarded compensation, under the State Compensation Act, based on total disability and said:

"The undisputed testimony in the case is that claimant (employee) had been doing heavy work for years up to the time of his injury while working for the appellant employer (L.C. Sand and Gravel Company)."

What Does "Patent" Mean?

A patent is a grant by the United States Government giving an inventor of a new device, method, process, or compound the exclusive right for 17 years to make, sell, and use the invention. After the 17-year period has expired, any one can, without liability, manufacture, sell or use the subject of the patent.

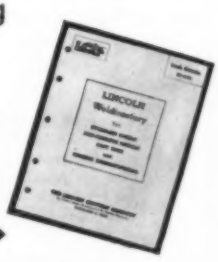
How to make dragline buckets

LAST 3 TIMES LONGER

with hardsurfacing

This 9 cubic yard dragline bucket costs $10,000. Normal life is one year, but periodic hardsurfacing with Lincoln Faceweld-12 chromium-carbide type electrodes has kept this bucket *in service for over 3 years.*

This is typical of the service you get from Lincoln hardsurfacing, whatever your needs may be. *Write for Weldirectory SB-1352 for data on the complete hardsurfacing line.*



THE LINCOLN ELECTRIC COMPANY

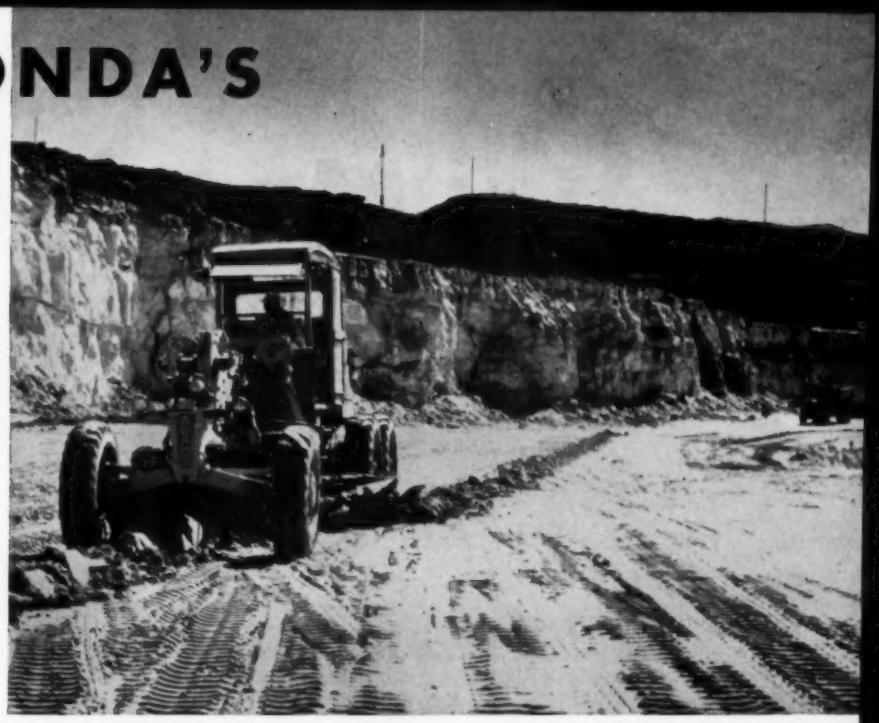
Dept. 5215, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

When Lincoln Faceweld | **H**as best abrasion service | **Y**et costs less | **WHY** use anything but Lincoln?

At ANACONDA'S Jackpile uranium mine:

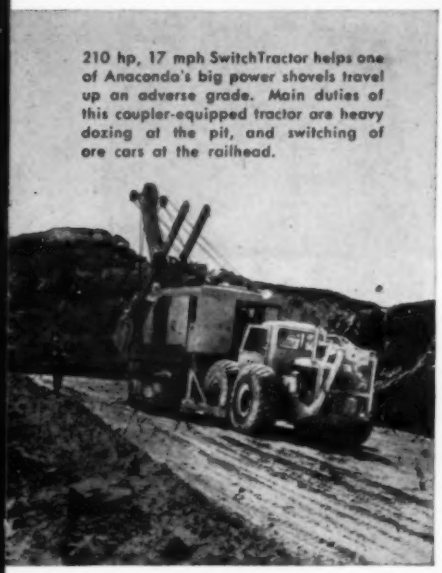
30 miles of hauler-worn roads patrolled by ONE Adams* 550



At New Mexico uranium mine, debris dropped by passing haul units is quickly bladed aside by Adams 550 grader. Anaconda Company assigns this versatile unit to the job of keeping 25 to 30 mi. of pit haul-roads smooth and well-drained. These roads take pounding of heavy haul units 6 days a week.

Anaconda Company's 30 miles of pit haul-roads at its Jackpile uranium mine near Laguna, N.M., take the continual pounding of big haul rigs 16 hours a day, 6 days a week. To level and smooth these road surfaces — Anaconda uses one man and one machine: an Adams 550 grader.

This big 123 hp, 26,370-lb. rig has the power, weight and speed to handle the job fast and accurately. Its 8 forward and 4 reverse gears always give the operator "just right" power-speed ratio to work any type of material... give it high travel speeds to move fast to new jobs.



210 hp, 17 mph SwitchTractor helps one of Anaconda's big power shovels travel up an adverse grade. Main duties of this coupler-equipped tractor are heavy dozing at the pit, and switching of ore cars at the railhead.

Levels roads, clears away debris

At the pit, 6 power shovels work continuously to load 26 heavy-duty hauling units. A steady stream of heavy hauler traffic flows over the network of roads connecting Anaconda's pit with its various dumps and stockpiles. The fast-moving Adams grader patrols these busy roads; goes wherever needed to fill ruts, level ridges, clear debris sifting down from banks or dropped by over-loaded haulers.

Operator uses "550's" big 12′ wide blade to work loads of chipped rock, clay, and earth. Blade is fully rotatable on the circle... can be extended a full 7½′ outside line of wheels for shouldering. To trim banks, grader has a vertical reach of 12½′... cuts at angles to 90°.

Utility SwitchTractor* dozes, switches

Anaconda uses another LeTourneau-Westinghouse unit to doze heavy clean-up around shovels, and for switching of ore cars at the railhead. It's the 210 hp, 17 mph SwitchTractor — a mobile, rubber-tired rig equipped with heavy-duty dozer blade in front, and a standard rail-car coupler in the rear. Dozer-switcher moves around wherever needed, handling a variety of jobs.

Cuts operating costs

Any pit operation shows more production... more profit... when a continuous pit and road clean-up policy is followed. Heavy-duty Adams 550 grader — with its wide selection of speeds — affords you dependable one-machine service in this important maintenance job. Like other big Adams graders, the "550" has a combination of operating features not found in any competitive unit. Ask for complete details.

An Adams Grader for every size job

New POWER-Flow 660* — 190 hp with torque converter	30,200 lbs.
Model 660* — 150 hp diesel	30,050 lbs.
Model 550* — 123 hp diesel	26,370 lbs.
Model 440* — 104 hp diesel	24,080 lbs.
Model 330* — 80 hp diesel	23,020 lbs.
Model 220 — 60 hp diesel	15,500 lbs.

*Choice of GM or Cummins engine
(Weights shown are usual working weights.)

*Trademark AGST-1245-M-b-5

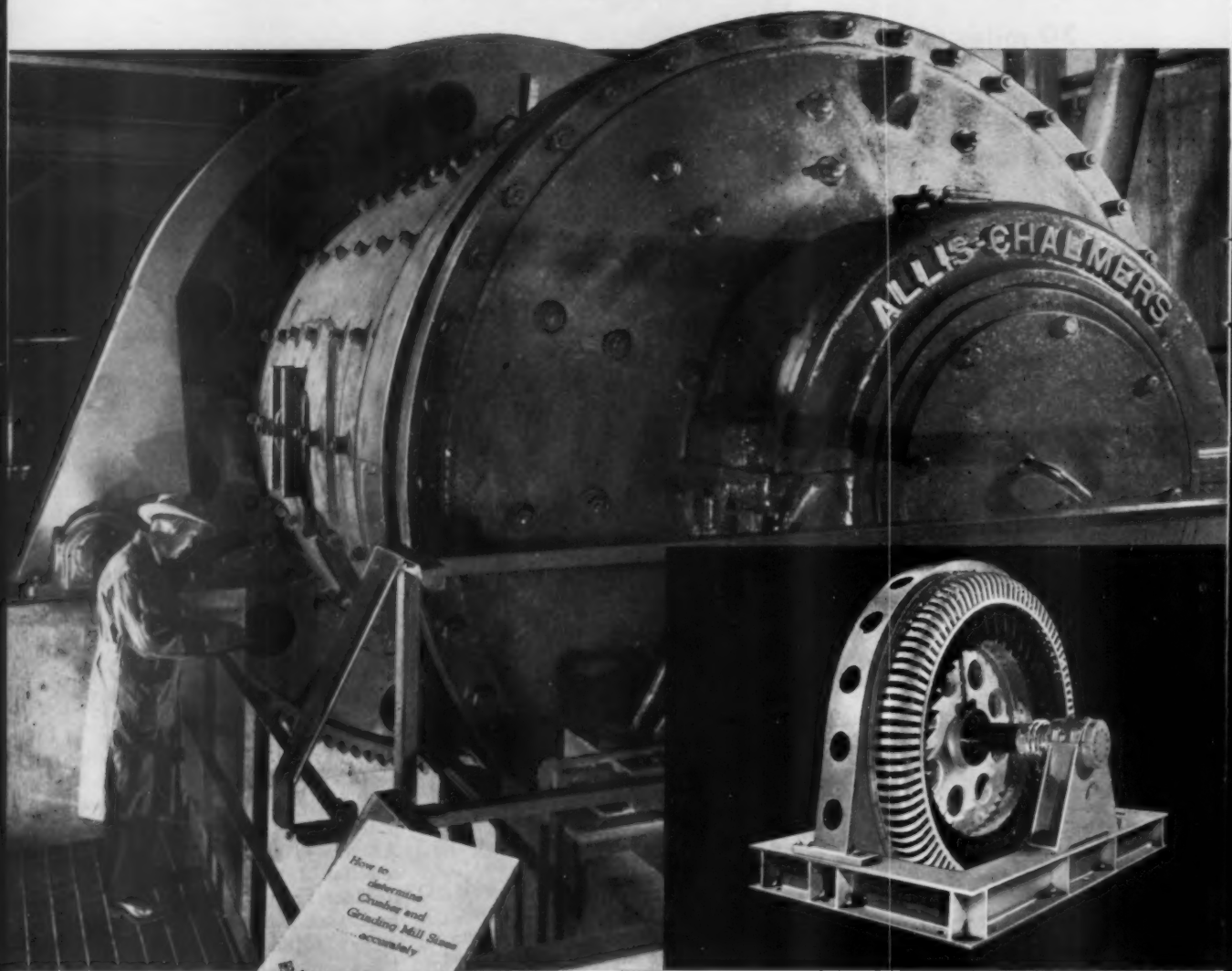
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

There's Only One SURE

Matched and



Send for Your Copy

This bulletin with its explanation of the "work index" formula enables you to evaluate any crushing or grinding operation . . . . compare efficiencies of plants, circuits, and machines. Write for this valuable reference. It offers the only truly scientific method of determining the right machine — the only scientific approach to maximum production at lowest cost. Ask for Bulletin 07R7995. Individual bulletins covering specific equipment are also available.

Motors — Should a totally-enclosed or an open-type motor be applied? Is a synchronous motor needed for power factor correction? The right answers to these questions are important to you. By applying the "work index" formula, Allis-Chalmers engineers can determine the required power input and apply the right size motor needed for optimum efficiency. Familiarity with a wide range of cement and processing operations helps us apply the "work index" method to your equipment applications correctly.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division. Milwaukee 1, Wisconsin.

ALLIS-

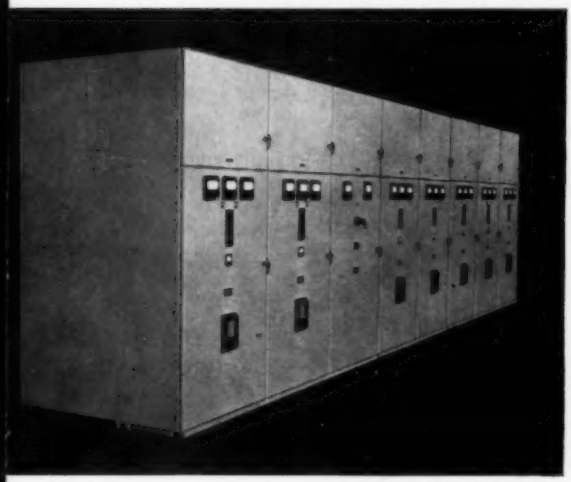
WAY of Getting Equipment

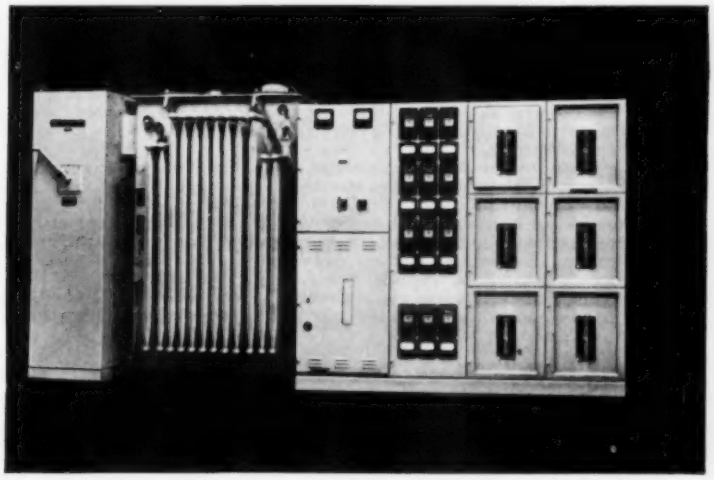
Correctly Applied

Specify Allis-Chalmers Processing Machinery *And* Electrical Equipment for the Cement Industry

Allis-Chalmers has long been recognized as a leading supplier of processing machinery for the cement industry. In fact more than 50% of the nation's cement is produced with A-C crushers, mills, screens and kilns. Allis-Chalmers is also one of the largest manufacturers of power equipment. *No other company* makes both the mechanical and electrical machinery for the cement industry. As a result, no other manufacturer has comparable facilities and experience necessary to apply and coordinate all equipment for a complete cement plant.

Industry's Top Technical Team at Your Service — Before a recommendation is made, requirements and variables are given a careful going-over by an Allis-Chalmers team comprised of research, design, manufacturing and application specialists from the electrical equipment and processing machinery departments. Characteristics of material, capacity, feed, preparation, balance of gradation, torque characteristics, system power factor needs are some of the many factors evaluated. Ideas and technical information evolving from this "meeting of minds" are then correlated in *one* department specializing in cement industry application. Components are matched to meet the requirements of your job. Responsibility for complete plant efficiency rests with one company.





Control — "Inching" a grinding mill is a push-button operation with synchronous motor control. Holding down the "inch" button rotates mill. The costly, time-consuming inconvenience of transferring from operating bus to inching bus is eliminated by using an automatic throw-over arrangement utilizing two high voltage air contactors.

Completely automatic and packaged pyro-processing control, with speed of feeder and kiln synchronized, is another recent Allis-Chalmers development.

Unit Substations — Allis-Chalmers LCS unit substations pay off in flexibility, ease of installation, maintenance, safety. Completely factory engineered incoming line units, transformer and low voltage switchgear combinations are coordinated and applied specifically for your distribution system. You get features such as breaker storage in the disconnected position in the unit, independent long time and instant trip elements on the breaker, dead-front circuit breaker construction.

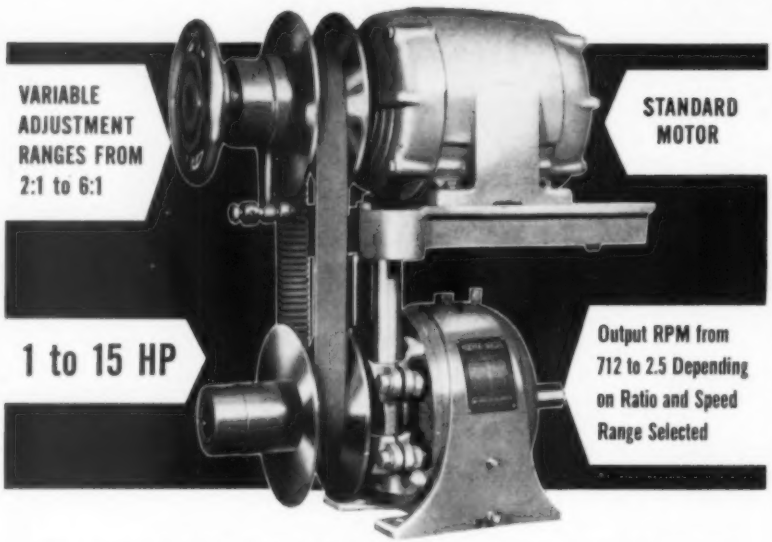
CHALMERS A-C ALLIS-CHALMERS

A-5384

NEW FROM FOOTE BROS.

Vari-Mount

VARIABLE SPEED MOTORIZED DRIVE


VARIABLE ADJUSTMENT RANGES FROM 2:1 to 6:1
STANDARD MOTOR
1 to 15 HP
Output RPM from 712 to 2.5 Depending on Ratio and Speed Range Selected

VARI-MOUNT—the new Variable Speed Motorized Drive offers infinitely variable speed selection, greater flexibility of operation, wide adaptability, easier maintenance and the sound design you expect from Foote Bros.

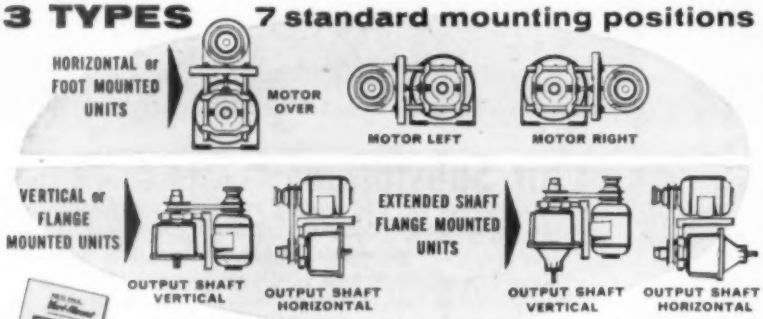
With a Vari-Mount, you can use your own motor—old or new NEMA Standard—or, the unit can be supplied with any standard motor of your choice. The Vari-Mount Reducer incorporates Duti-Rated Lifetime Gearing with file-hard tooth surfaces and tough, ductile cores for maximum life and efficiency.

Positive handwheel control of the adjustable pulley permits pin-point accuracy in speed selection over the entire range. Vari-Mount Units may be equipped with Remote or Automatic speed selection devices if required.

Spring loaded, self-centering Variable Pulley and close-coupled in line design insures permanent belt alignment, smoother performance, and minimum overhung load on motor bearing. No thrust load is imposed on motor bearings at any speed or during speed changes.

Quick belt changes made possible by the wide-open design of the Vari-Mount, together with easily accessible lubrication fittings make maintenance an easy matter.

3 TYPES 7 standard mounting positions



Want complete details?...Write for Vari-Mount Catalog today

this trademark stands for the finest industrial gearing made

T. M. REG. U. S. PAT. OFF.

FOOTE BROS. Duti-Rated LIFETIME GEARING

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION

4571 SOUTH WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

However, the invention must be new throughout the world, otherwise an inventor cannot obtain a valid United States patent. This is not the law in other countries but the United States patent laws clearly specify that no valid patent will be issued on any invention previously used or described in any part of the world.

For example, in *Aghnides v.* Goodrie, 210 Fed. Rep. (2d) 859, it was shown that an inventor, named Aghnides, applied for and obtained a patent on a "mixing device." Although the Patent Office issued the patent to Aghnides, the higher court later held the patent void and said:

"In my opinion the Aghnides patent Number 2,210,846 is anticipated by British patents Number 6012 of 1909 and 405316 of 1933 and is, therefore, invalid. Aghnides' assembly of old elements performs no new or additional function and achieves no new or unusual or surprising result."

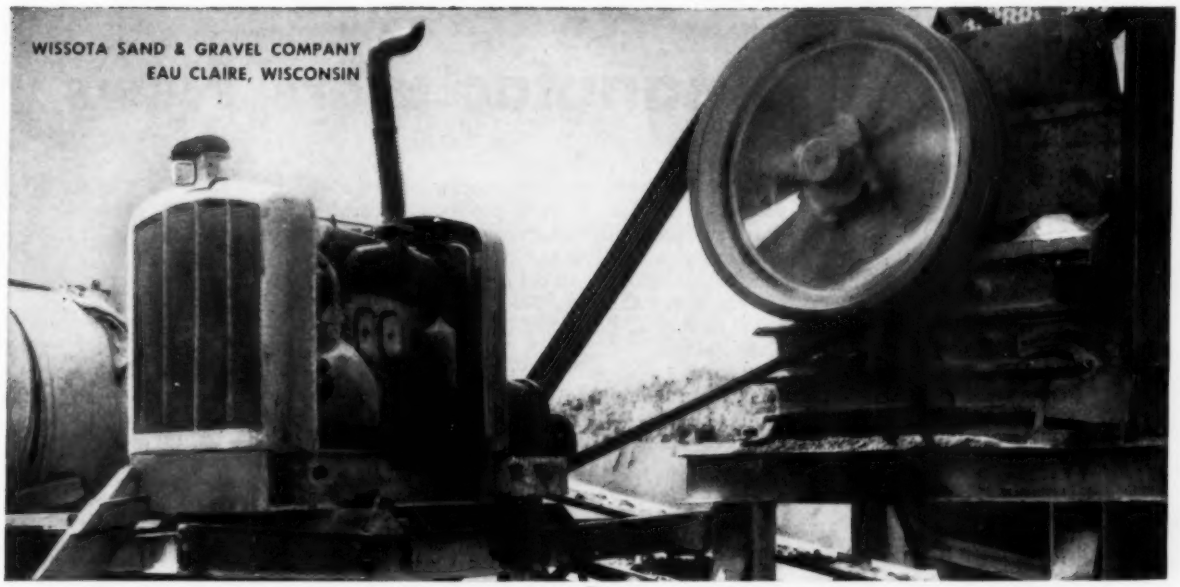
What Are Improvements

A reader asked: "What does the word 'improvements' mean when used in a state law or constitution which exempts sand and gravel companies from paying taxes to the state or county on improvements of its real property?"

According to a late higher court decision, an "improvement" is any *new* construction, not including ordinary repairs or replacements.

For instance, in *Pasade v. Los Angeles County,* 230 Pac. (2d) 801, the testimony showed that a state's constitution provides that corporations and other property owners shall not pay taxes on any "improvements" to their present holdings or system. A corporation made considerable "replacement" on its real estate, and the legal question presented the court was whether the county could tax the corporation on the basis of the present valuation of its real estate, or whether the older valuation still is effective for taxation purposes. The court held that since the improvements were not ordinary repairs but replacements of old and obsolete equipment with new and modern equipment, the corporation must pay taxes on the present valuation of its real estate holdings.

For comparison see *White v. County,* 112 Pac. (2d) 595. The facts in this case are that after a corporation purchased certain real estate, it built a concrete flume to replace a wooden one. The higher court held that the new flume was not exempt from taxation as a "replacement," or mere "improvement."



OVERHAULS BE DAMMED!

Wissota's using Cities Service lubricants

Overhaul? What's that?

Wissota Sand and Gravel is too busy supplying aggregates for dams and highways to tolerate downtime . . . and they don't have to!

Take the G.M. diesel above. Since 1948, it has run without major overhaul . . . and none is anticipated. It operates on Cities Service C-300 Motor Oil.

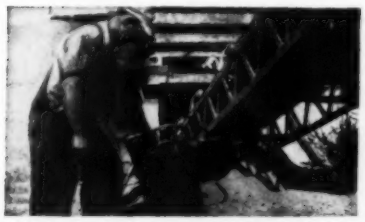
Or consider Wissota's UD 24 International. So far, it has logged six years with nothing but a new set of rings, installed after 4500 hours. Again, thanks to Cities Service C-300 Motor Oil.

And don't overlook the diesel-driven locomotive crane . . . the one that's gone seven years with nothing but an adjustment of its injectors . . . and moved an estimated 2,000,000 tons of material. Score another for Cities Service C-300 Motor Oil.

"Actually, we've enjoyed similar performance from our seven washing plants and all 58 pieces of mechanized equipment, since we switched to Cities Service," says Treasurer Ray Larson.

"This, in the face of a yearly production that runs around 750,000 tons! All our Cities Service products—C-300 Motor Oil, Trojan MP Gear Oil, and No. 2 Diesel Fuel—keep us running trouble-free."

Like Wissota, you can expect big things from Cities Service fuels and lubricants. Get the facts, without obligation, from a nearby Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



Where Lubrication Counts! "We get terrific bearing life since we switched to Cities Service," says Treasurer Ray Larson.

One of 7 Washing Plants of Wissota Sand & Gravel. With the aid of Cities Service lubrication, they turn out 750,000 tons of aggregates a year!

Equipment Galore! 40 trucks, 14 cranes and shovels, and 4 bulldozers. After 7 yrs. using Cities Service C-300 Oil, one shovel needs no overhaul!

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

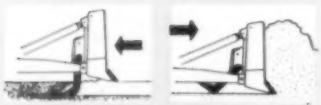
FASTER
"2 WAY" DOZING
with
PRECO
Back-Rippers

Because these rugged Back-Rippers break up the ground while the tractor is backing up — thus permitting the blade to make a **full** load **faster** on the forward trip — they give you **double advantage.**

Preco Back-Rippers make **every** dozing job easier — they pull out rocks and roots. Steep banks can be raked down quickly and road building is speeded up as the Rippers tear out boulders, ledge rock and hard material.

FOR . . . Building Pioneer Roads
Clearing Land and Rights-of-way
Gravel Pit Operations
Slate Breaking in Strip Mines
Logging
Mounted on Pusher Tractor for Faster Scraper Loading.

BACK UP RIPPING **EASIER FORWARD DOZING**



Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

See your Caterpillar Dealer or send the coupon for information.

PRECO INCORPORATED
6300 E. Slauson Avenue
Los Angeles 22, Calif.

Please send information on Preco Back-Rippers.

Name_____

Address_____

Manufacturers' News

KARL H. BAESSLER has been appointed director of wire product development for the Colorado, Wickwire Spencer, and Pacific Coast divisions of The Colorado Fuel and Iron Corporation, Denver, Colo., with headquarters at the firm's Oakland, Calif., plant.

Mr. Baessler has been associated with CF&I since 1934. He has held various supervisory positions, and since 1949 has been works manager of the Pacific Coast division.

KENNETH H. CADIGAN and GILMORE HIETT, sales and advertising executives, are newly-elected members of the board of directors of The Gorman-Rupp Company, Mansfield, Ohio.

Both officials joined the company in 1946. Mr. Cadigan is vice-president in charge of sales, and Mr. Hiett recently was promoted from manager of advertising and sales promotion to vice-president.

K. H. Cadigan

G. Hiett

The board of directors also announces the promotion of CHARLES J. TAYLOR to the position of chief engineer.

Following the death of F. W. MILBOURN SR., for 37 years president and senior executive officer of The Coe Manufacturing Company, Painesville, Ohio, the directors held a special meeting for the election of new officers.

The new president is F. W. MILBOURN JR., who succeeds his father after 23 years of association with Coe. Mr. Milbourn has been vice-president and general manager for the last 10 years.

E. P. MORRIS has been named vice-president and sales manager. For the last 23 years, Mr. Morris has headed the firm's general sales activity.

A newly-appointed vice-president is ARTHUR S. HOLDEN JR., who has been associated with the firm for 20 years, serving in various capacities in the sales and engineering departments.

J. S. DODDS, senior officer in years of service (he joined Coe 37 years ago), is secretary. Factory activities are under the supervision of R. M. Fox, general superintendent, who has 29 years of service.

Massey-Harris-Ferguson, Inc., Racine, Wis., has purchased the assets, patents, and design of Mid-Western Industries, Inc., Wichita, Kans.

Mid-Western's products, including loaders, back hoes, cranes, scarifiers, dozer blades, fork lifts, utility buckets, and the Davis Pit-Bull, will continue to be marketed under the *Davis* brand name. M-H-F plans to broaden and expand the distribution of these products.

According to Albert A. Thornbrough, M-H-F president, Mid-Western operations will become part of the Massey-Harris-Ferguson Industrial Division. Charles J. Davis, president of Mid-Western, has been named division general manager, and all present Davis personnel will be retained.

M. F. SMITH has been appointed New York district manager of the Republic Rubber Division, Lee Rubber & Tire Corporation, Youngstown, Ohio. Mr. Smith will be responsible for the distribution of Republic's line of belting, hose, packing, and molded and extruded rubber products in the New York metropolitan area.

Mr. Smith comes to his new position with a background of more than 30 years in the sales, sales management, and service of industrial rubber products.

WILLIAM G. MUELLER, formerly mechanical goods district sales manager in Boston for the United States Rubber Company, New York, N. Y., has retired from the company after 47 years of service.

Mr. Mueller joined the rubber company as a clerk in 1910. Three years later he joined the mechanical goods sales staff, and in 1934 he was appointed mechanical goods district sales manager in Boston. He continued in that post until 1954 when he was appointed a special sales representative for the company's engineered rubber products in Boston.

yours for the asking...

Specialized Counsel on Quarry Hauling

Having the right trailer to handle the *specific type* of material on *your job* can make a big difference in your profit picture. That's why your Athey-Caterpillar Dealer and Athey offer you the industry's most complete line of haul units — and the service of men with the know-how and experience to help you select the right size and type of trailer.

We'll be happy to work with you — to analyze your job requirements, submit a detailed analysis and an equipment recommendation. You'll find your Athey-Caterpillar field man well-equipped to be of profitable service to you.

He'll help you select the exact trailer size and features you need to gear your job for greatest output. He'll give you facts on the world's most complete line of haulers — rear dump, hydraulic ejection, side dump or bottom dump in capacities up to 45-tons.

They're designed and manufactured by Athey — leader in trailer units for a third of a century!

See your Athey-Caterpillar Dealer today — or fill in the coupon below — for complete details and mail to ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois.

Athey

THE *Complete* TRAILER LINE...

by the Leader

Send the coupon for EXPERT COUNSEL

Athey Products Corporation
5631 West 65th Street, Dept.
Chicago 38, Ill.

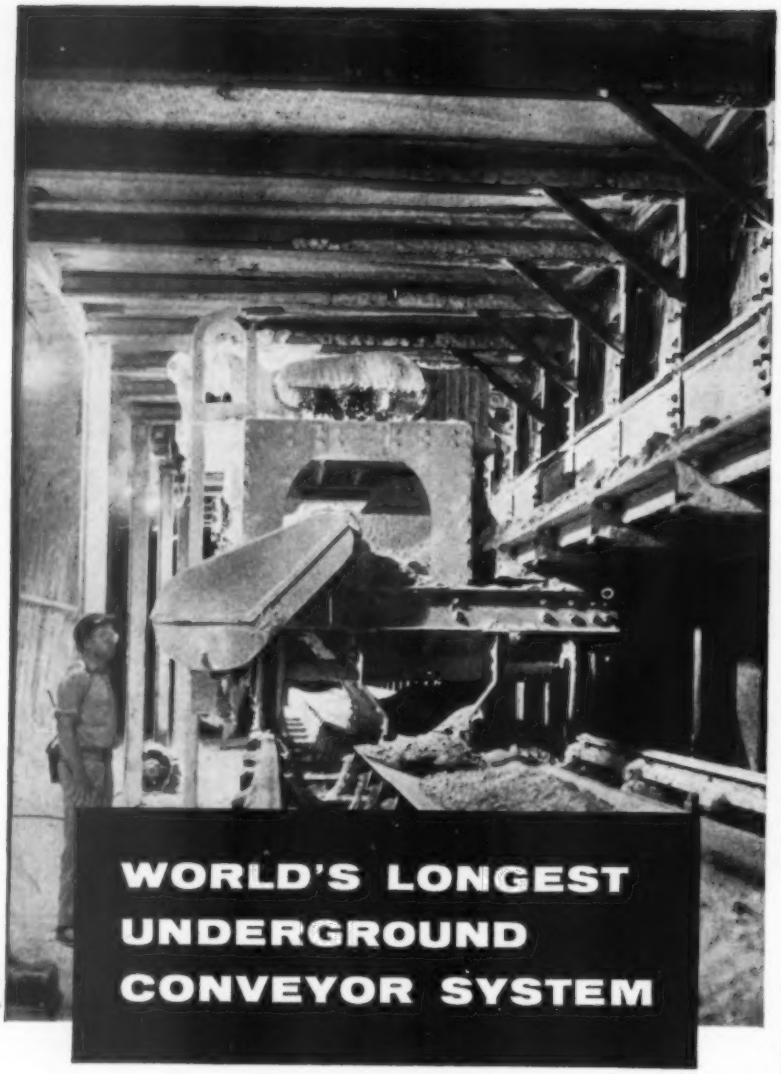
I'm interested — I would like to have an Athey Earthmoving expert call on me — at no obligation.

Name_____

Firm Name_____

Address_____

City_____ State_____



This rotary plow feeder is part of a 45-unit, 7½ mile Hewitt-Robins belt conveyor system located 1000 feet underground in Carlsbad, N. M. The system is designed to carry up to 550 tons of potash ore per hour from mining areas to a storage pit. Here the H-R rotary plow feeder scoops ore onto another conveyor for its trip to the refinery skip hoist.

As in hundreds of other industrial installations, this Hewitt-Robins belt conveyor system effects a material saving in handling costs. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS...POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE...VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

ALBERT FEUCHT has been named manager of the Cleveland, Ohio, plant of the Le Roi Division, Westinghouse Air Brake Company, Milwaukee, Wis. Mr. Feucht, formerly manager of manufacturing at the plant, succeeds Louis E. Dondero, who was named manager of Le Roi's main plant at West Allis, Wis.

Mr. Feucht joined Le Roi in 1945 as chief engineer of the Cleveland plant, then a division of Le Roi. He was in charge of designing and developing several of the first Le Roi air tools manufactured. In 1946 he was named manager of manufacturing.

As manager of the Cleveland plant, where Le Roi construction tools and Le Roi-Cleveland mining tools are made, Mr. Feucht will be in charge of all phases of operations.

A. Feucht

G. M. Shibley

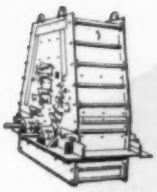
GLENFORD M. SHIBLEY has recently been named to the newly-created position of manager of territorial sales for The Patterson Foundry and Machine Company, East Liverpool, Ohio. He has been assistant to the director of sales since joining the company in January of this year.

The position was created to integrate more closely field activites with home office sales operations. Mr. Shibley will be responsible for supervision, administration, and training of Patterson's sales organization in 19 cities in the United States and Canada.

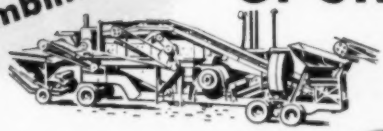
The election of ALEX S. ARANYOS as president of Fruehauf International Ltd., a wholly-owned subsidiary of Fruehauf Trailer Company, Detroit, Mich., has been announced.

Mr. Aranyos, who joined Fruehauf in 1953, has been serving as vice-president and director of foreign operation for the parent company during the past year.

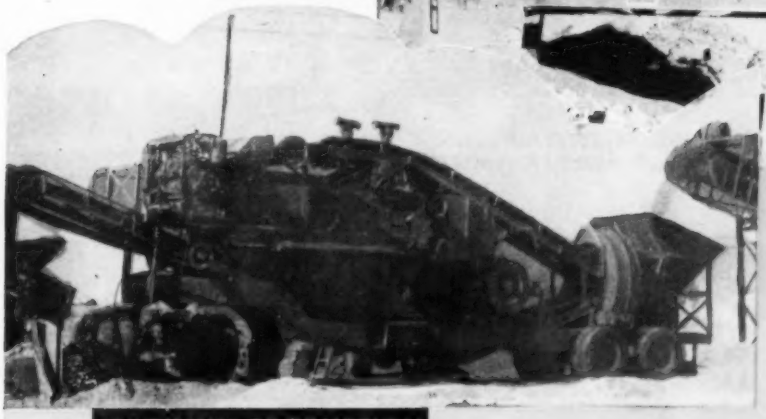
Fruehauf International, Ltd., manufactures Fruehauf truck-trailers and other products and also licenses others to manufacture these products outside the United States.



Cedarapids Skid-Mounted Primary Portable Secondary Combination . . . PRODUCES BIG VOLUMES OF STRICT-SPECIFICATION AGGREGATE



Cedarapids "Packaged" skid-mounted stationary 3645 Double Impeller Impact Breaker produces a high percent of required smaller sizes in the primary reduction operation. Cedarapids 36" x 14' Feeder feeds quarry rock onto a single deck 40" x 6' Vibrating Grizzly to by-pass fines around the Impact Breaker.



Material from the Double Impeller is conveyed to a surge pile and is then fed into this Cedarapids Portable 4033 Hammermill Secondary Plant. Oversize from the top screen deck goes through the hammermill for secondary reduction, while material passing the ¾" bottom screen deck is delivered directly to the Cedarapids screen-bin unit.

MAXIMUM PRODUCTION OF SPECIFIED SIZES

¾" to ⅜" MATERIAL		
Size	Minimum	Maximum
1"	100	
¾"	95	100
½"	50	90
⅜"	10	40
No. 4	1	10
No. 8	1	6
No. 30	1	6
No. 50	1	6
No. 100	1	5
No. 200	1	4

LIMITS—⅜" Chip Material		
Size	Minimum	Maximum
⅜"	100	
No. 4	60	80
No. 8	40	55
No. 30	17	28
No. 50	17	25
No. 100	15	22
No. 200	11	17

The combination of a Cedarapids 3645 Double Impeller Impact Breaker and a Cedarapids Portable Hammermill Secondary used by Beu & Sons Co. of LaPorte City, Iowa, is producing 70% of ⅜" minus and 30% of ¾" material at an average 220 ton per hour production rate . . . and as high as 5800 tons of 1¼" in 18 hours . . . with a high crushing percentage. Look at the screen-analysis table on this plant's production. This type of operation proves the versatility and productivity of Cedarapids equipment for turning out strict-specification aggregate in the tonnages demanded.

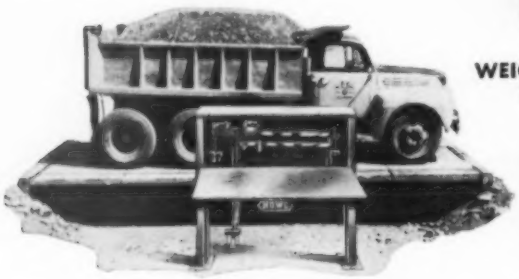
IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Faster, Lower Cost Handling of

ASPHALT CEMENT AGGREGATES

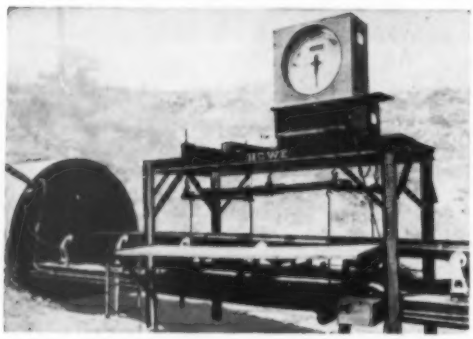
AUTOMATIC BATCHING

is simple with the Howe Batchmaster. Adjust the ingredient setup panels to the desired formula, touch a button, and the mix is automatically proportioned, including aggregates and cement or asphalt. Accessories such as automatic recording—mixer time controls—moisture compensation and many more are available. Systems tailored to your operations.



WEIGH ANYTHING ON WHEELS, ANYWHERE!

Take Howe Portable Vehicle Scales to the site, set up on timber or concrete footings—no pit needed. Capacities 20 to 70 tons—lengths 20 to 60 feet.



WEIGH MATERIAL IN MOTION

to high accuracy, with Howe Conveyco Conveyor Scales on existing conveyors or as self-contained units. Control conveyor speed or feeder rate for steady discharge—automatically.

From the simplest weighing requirements to automatic control of materials by electronics, you'll find the *right* weigh is the HOWE way—developed out of a century of experience with industrial scales. For immediate service from any of 23 branches with fully equipped service departments, consult the yellow pages of your telephone directory.

The HOWE SCALE Co
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.
RUTLAND • VERMONT

Harbison-Walker Refractories Company, Pittsburgh, Pa., has appointed ROBERT R. BOWMAN district sales manager of the Buffalo sales area. He had been a sales representative in the company's Buffalo office for the last five years.

His experience with Harbison-Walker includes a 3-year period as sales representative in the Cleveland area and 3 years in the Technical Sales Department.

Three recent elevations within the financial section of The Frank G. Hough Company, Libertyville, Ill., have been announced.

ROBERT L. SMITH has been elected to the position of secretary and treasurer. He has been associated with the firm for over 11 years, and was formerly assistant secretary and assistant treasurer.

FRANK M. DOCAUER, former staff assistant, has been elected assistant secretary. He has been with the company 14 years.

Formerly assistant manager of the Cost Department, FENTON O. RICHARDS has been elected controller of the company.

R. L. Smith

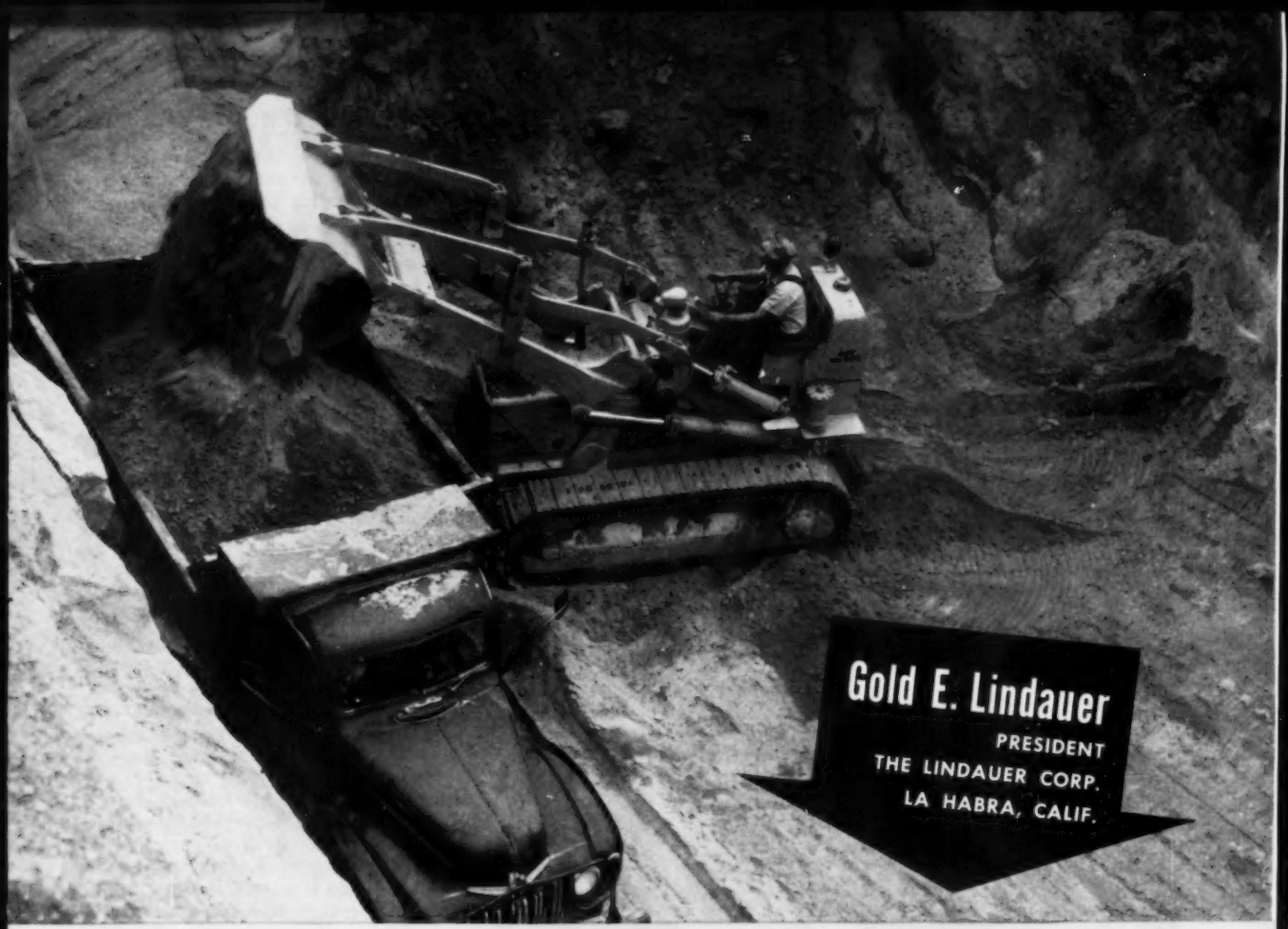
R. G. Allen

ROBERT G. ALLEN has been elected to a new vice-presidency created by the Bucyrus-Erie Company, South Milwaukee, Wis.

Mr. Allen was formerly president of the Pesco Products and Wooster divisions of the Borg-Warner Corporation at Bedford and Wooster, Ohio. Before joining Borg-Warner, he was vice-president of the Great Lakes Carbon Corporation, New York, N. Y., and general manager of its electrode division.

Reo Motors Division, White Motor Company, Exton, Pa., has appointed JOHN S. JOYCE to the newly-created position of branch business manager for the midwest region.

As branch business manager, Mr. Joyce will be responsible for and have authority over all functions pertaining directly to the operational activities in the ten factory-owned branches of Reo's midwest region.



This No. 955 Traxcavator* loads 750 yards a day and "that doesn't begin to make it work"

Each 7½-hour day, this new CAT* No. 955 Traxcavator loads about 750 yards of sand for construction work at Lindauer Corp., La Habra, Calif. It also handles decomposed granite and topsoil. Mr. Lindauer likes its high production and speed of operation.

"We like everything about this Traxcavator," he says. "The hoist works fast and you don't have to sit and wait for it. It's loading 750 yards a day and we haven't really begun to make it work."

Operators like the way this unit handles, too. Bucket lift and tilt levers are positioned for easy one-hand operation. And the exclusive Caterpillar oil clutch reduces maintenance and adds to the machine's long, productive work life.

This fast 75 HP excavator loader has a 1½-cu.-yd. bucket, 80 inches wide. The bucket has full 40-degree tilt back at ground level to prevent spillage. And its 128-inch lift height makes easy loading for trucks.

There are three Caterpillar-built Traxcavators. The smaller No. 933 has a 1-cu.-yd. bucket and a 50 HP Cat Diesel. The larger No. 977 has a 2¼-cu.-yd. bucket, powered by a 100 HP engine.

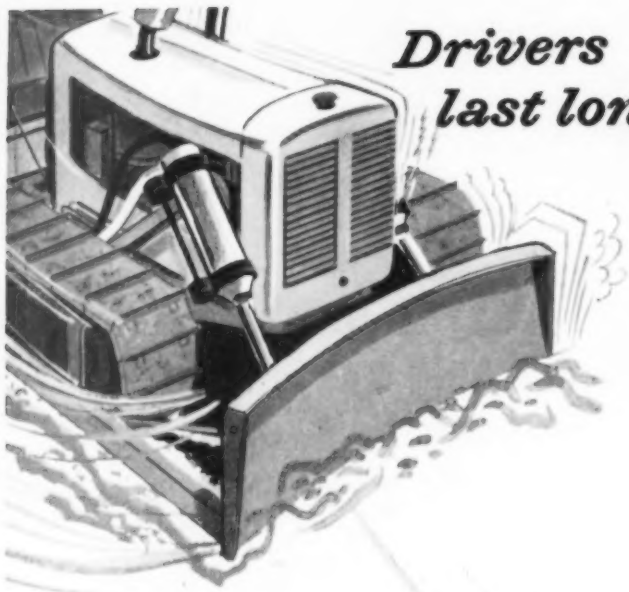
Your Caterpillar Dealer will demonstrate the model that fits your exact needs on *your* job . . . at *your* convenience. And he backs each machine with 24-hour service, and quality factory parts.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK



Drivers last longer...

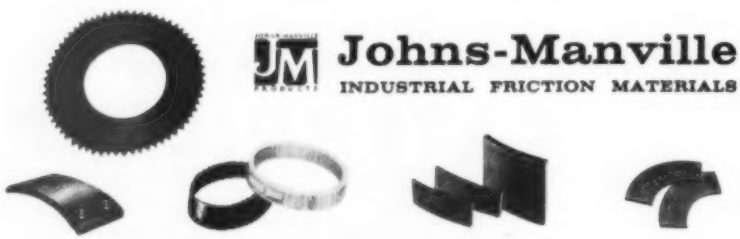
when heavy-duty machines use J-M Industrial Frictions

Johns-Manville Friction Materials deliver the safe, dependable performance that frees your drivers from worry about personal danger. And remember, it's much easier to replace linings than good operators. You get more out of your equipment, too, in terms of working time and "pay loads" handled.

That's because these rugged, durable facings and blocks are engineered for the job . . . and designed for outstanding performance plus maximum service life on trucks, shovels and heavy machinery.

Johns-Manville makes a wide range of industrial friction materials such as linings, facings, cones and segments that are "original parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are available in Johns-Manville Assembled Sets that assure greatest safety in your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario. Ask for booklet FM-35A.



Johns-Manville
INDUSTRIAL FRICTION MATERIALS

Appointment of DAVID R. FREEBERG as district sales manager for the Diamond Iron Works Division, Goodman Manufacturing Company, Chicago, Ill., has been announced. Mr. Freeberg will represent Diamond in the States of Ohio, Indiana, eastern Missouri, Illinois, Wisconsin, Michigan, and in eastern Ontario, Canada.

Mr. Freeberg has been with the Diamond organization since 1941. Prior to that time he had eight years' experience operating a stone and quarry business. Mr. Freeberg's headquarters will be at the company's main plant in Chicago.

Acquisition of the Tyson Bearing Corporation, Massillon, Ohio, by SKF Industries, Inc., Philadelphia, Pa., manufacturer of ball and roller bearings, was announced recently by Edwin R. Broden, SKF president, The new division, known as the Tyson Bearing Company, division of SKF Industries, Inc., manufactures tapered roller bearings.

SKF maintains its general offices and two plants in Philadelphia. Other plants are located in Hornell, N. Y., and Shippensburg and Altoona, Pa.

A. Stewart Murray, president of the Tyson Bearing Corporation since 1955, will continue as president of the new division.

According to a recent announcement, R. P. KESSLER has been appointed director of research and development for Arkell and Smiths, New York, N. Y. Mr. Kessler formerly served as packaging engineer and director of packaging research.

The John A. Roebling's Sons Corporation, Trenton, N. J., is nearing completion of a $2,500,000 installation of new production facilities for high voltage power cable and other electrical wire products.

New equipment now or soon to be in production will increase size ranges and production capacity at the Electrical Wire Division. New vulcanizing equipment capable of insulating power cable of 3,000 ft. and more in length is now in operation.

In addition to the new production facilities, Roebling has installed extensive new laboratory and research equipment. This will enable Roebling to carry on expanded activities in the development of new types of cable, new insulating materials, and other electrical wire and cable improvements.

At Warner Co.'s Cedar Hollow Quarry Big AUTOCARS Keep the Crusher Working to Capacity

Warner Co.'s Cedar Hollow Quarry, near Phoenixville, Pa., supplies better than 550,000 tons of stone a year. It's a big operation calling for big hauling equipment. On the haul from quarry face to crusher, Warner uses three Autocar units. Two are Autocar 6-wheel gasoline tractors pulling 17-ton-capacity side dump semitrailers. The other is a Diesel 10-wheel truck, with a 17-ton side dump body, pulling a 17-ton full trailer with side dump body. As the grade is only 4%, Warner hooks this additional 17-ton load onto the Autocar truck, hauls double the payload with only one power plant and one driver. Loads of 100,000 lb. are commonplace, and the three rigs are sufficient to keep the crusher at Cedar Hollow working to capacity.

The haul from crusher to stockpile is steeper—about 12%. Here two single-axle Autocars of 15-ton capacity, one with a diesel engine, one with a gasoline, operate on a fast trip cycle. Since they replaced three 10-ton trucks, they are effecting a considerable saving on the operation.

Warner Co.'s daily cost records supply convincing evidence that the extra power and stamina built into every Autocar is an investment in hauling economy. Whether it's a double payload or a single one with a quick turnaround, Autocars perform with outstanding dependability. The Warner fleet, now 2 years old, has required no major overhaul, only routine maintenance. The quality is there, applied with custom engineering. Get in touch with your White-Autocar distributor and find out how these great trucks can make your operation more profitable.

White Autocar

AUTOCAR TRUCKS

AUTOCAR DIVISION

The White Motor Company • Exton, Pa.

dust control too expensive for your plant?

A CHEM-JET SYSTEM COSTS ONLY 1/10 AS MUCH AS OTHER METHODS

A Chem-Jet Liquid Dust *Control* System can be job-engineered and installed in your plant for about 10% of the cost of any dust *collection* system. This is not merely an idle claim; it can be proved by actual dollar comparisons.

There are many reasons for Chem-Jet's low cost. The basic reason is *method:* Chem-Jet stops dust *before* it becomes airborne. There is no collection or filtration . . . and therefore, no expensive enclosures or ducting. Chem-Jet works right out in the open, to suppress dust right at the source area . . . at crushers, conveyors, etc. Operating costs are counted in pennies. Dust-free operation is guaranteed.

This unique method of dust control is fully explained in illustrated Bulletin CJ-1. Send for your copy today.

Johnson March

DUST CONTROL ENGINEERS

1724 Chestnut Street, Philadelphia 3, Pa.

Appointment of several new distributors for sales, parts, and service of FWD transport tractors, dump haulers, and ready-mix trucks have been announced by officials of the Four Wheel Drive Auto Company, Clintonville, Wis.

General Truck & Equipment, Inc., 2535 University Ave., St. Paul, Minn., will be exclusive FWD dealers in the Minnesota counties of Hennepin, Ramsey, Washington, Dakota, and Anoka.

Humphrey Truck Sales, 136 E. Mineral Street, Milwaukee, Wis., is the new FWD distributor in eastern Wisconsin, in the counties east of and including Green, Dane, Columbia, Dodge, Fond du Lac, Winnebago, Outagamie, Brown, Kewaunee, and Door.

Burg & O'Connor Motors, 16-18 N. Main St., Clintonville, Wis., has been appointed dealer in Shawano, Portage, Waupaca, and Waushara counties of Wisconsin.

Midwestern Engine and Equipment Co., Inc. 4645 Sapulpa Rd., Tulsa, Okla., has been appointed a new dealer for sales, parts, and service of FWD transport, highway maintenance, ready-mix, and oilfield trucks in Oklahoma.

New manager of sheet and strip sales at the Cincinnati steel service plant of Joseph T. Ryerson & Son, Inc., is FREDERICK B. WINTHER, JR. Mr. Winther formerly held a similar position at the company's Milwaukee plant. He takes over the Cincinnati post from WILLIAM F. DAGON who has been transferred to the new Ryerson plant in Indianapolis.

The appointment of the McAllister Equipment Company, 1615 N. Mannheim Rd., Melrose Park, Ill., as a distributor of equipment manufactured by Austin-Western, Aurora, Ill., a division of the Baldwin-Lima-Hamilton Corporation, has been announced.

Construction has been started on building alterations and extensions for a new wire drawing mill at St. Louis, Mo., for the Leschen Wire Rope Division, H. K. Porter Company, Inc., New York, N. Y.

Scheduled for completion in September, the mill is expected to be in operation in December. Cost of the project is estimated at $1,700,000.

The New York offices of the American Brake Shoe Company have been moved to 530 Fifth Avenue, New York 36, N. Y.

GYRO-FLO + CRAWL-IR

. . . a highway construction team that gives you completely mechanized drilling power at its RUGGED BEST!

IR CONTRACTORS' COMBINATION

THE new Ingersoll-Rand CRAWL-IR is the most completely mechanized, self-propelled crawler drill ever developed. Boom swing, boom lift, tower tilt, tower swing and tower lift are all hydraulically controlled at the touch of a throttle, permitting faster, easier and safer setups for drilling in any position. And because it tows its own air compressor, even up grades and over rough terrain, you don't have to take other equipment off the job for this purpose.

Teamed up with a Gyro-Flo 600-cfm, it gives you a drilling combination that has no equal for economy and dependability of operation. The famous Gyro-Flo rotary action, thoroughly proved by more than six years of on-the-job service, is your best assurance of low-cost, virtually maintenance-free air power. Ask your IR Distributor or representative for complete information on this pace-setting drilling team.

Ingersoll-Rand 14-612

11 Broadway, New York 4, N. Y.

THE BEST AIR EQUIPMENT FOR BETTER HIGHWAYS

abrasion...

is this your wire rope problem?

LESCHEN wire rope experience solves this problem for you in "*Red-Strand*" Bulletin 101

SEND FOR YOUR COPY TODAY—You'll find this bulletin full of practical suggestions for minimizing the destructive effects of abrasion on wire rope you use. That means longer useful life, less down time, lower costs. These suggestions are in simple, non-technical language, easy to follow, yet technically sound...based on the same full century of rope making experience that insures consistent top quality in every foot of *Leschen Red-Strand Wire Rope*. So write for Bulletin 101 today. At the same time, ask for free engineering counsel on any other wire rope problem you may have experienced. Address: Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.

LESCHEN
Red-Strand

LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

OLIVER J. NESLAGE, vice-president, commercial sales, Joy Manufacturing Company, Pittsburgh, Pa., died at his home at the age of 64. Mr. Neslage was a key figure in the expansion program Joy has been undergoing since World War II.

Mr. Neslage's entire business career had been spent with Joy and its predecessor company, Sullivan Machinery Company. In 1916 he joined Sullivan as a sales engineer, working out of the St. Louis, Mo., district office. He was subsequently transferred to the firm's office in San Francisco, where he remained until 1921.

In 1926 Mr. Neslage was appointed district manager for the Mexico City office. In 1943 he was appointed to the executive staff of Sullivan Machinery as vice-president in charge of sales. He held this position until 1945, the year of the merger between Sullivan and Joy.

While merger negotiations were going on, Mr. Neslage was made vice-president, commercial sales for Joy, the assignment he was fulfilling at his death.

O. J. Neslage

R. M. Smith

RALPH M. SMITH has been named manager of the Zanesville, Ohio, plant of The Timken Roller Bearing Company, Canton, Ohio. Mr. Smith, was formerly superintendent of the plant, replaces ELMER J. SCHWEITZER, who recently became managing director of Australian Timken Limited.

In conjunction with the promotion of Mr. Smith, two other advancements were made at the Zanesville plant. NORMAN C. HOFER, formerly general foreman, becomes superintendent, and RICHARD B. GIBBONS, has been made general foreman.

SAMUEL A. GAREE has been appointed manager of operations for The Gas Machinery Company, Cleveland, Ohio. In his new position, Mr. Garee co-ordinates and supervises the operating departments required for processing orders from estimating and engineering to fabrication and delivery.

Rowe Construction Co., Bloomington, Illinois, uses the Model 374 Conveyor, one of many types and sizes of Barber-Greene portables.

The president of Rowe Construction Co. reports

"Our next portable conveyor will be another Barber-Greene"

"We have given our Barber-Greene conveyor four years of hard service and its performance has been tops. We produce sand and gravel for highway departments and for our own use. So we move our plant three and four times a year. Towing our conveyor from job to job presents no problem at all. We just hitch it up to a truck and move out.

"And it was no big job to lengthen our conveyor from 51 to 60 feet. All we did was order a nine-foot intermediate section and bolt it into place. All carriers, returns and decking were already in place and aligned.

"With this kind of reliability and easy flexibility, we feel sure our next portable conveyor will be a Barber-Greene."

Straight-forward reports like D. H. Rowe's provide the proof of the superior performance and widespread acceptance of Barber-Greene conveyors. Handling coal, sand, gravel and other bulk materials, these versatile conveyors operate on a virtually automatic basis . . . cut labor costs substantially.

Not just portability, but road-ability is one of the many features that save time and money for the Rowe Construction Co.

Literature shows the many superior features of Barber-Greene portables. Write for your copy.

56-21-PO

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Brunner & Lay, Inc., Franklin Park, Ill., has opened a new Canadian plant in Dorval Station, Que. The Canadian plant will manufacture tungsten carbide Rok - Bits and tungsten carbide Integral Drill Steel for the mining, quarrying, and construction industries, and a complete line of pneumatic tool accessories and drill steels. E. A. Bowman, general manager, is in charge.

Two distributor appointments for *Lima* shovels, cranes, draglines, and pull shovels have been announced by the Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.

Werckle Construction Equipment Co., 718 Miller Ave., Rockford, Ill., will cover the nortwestern portion of the State of Illinois, consisting of 15 counties.

Western Contractors Supply Co., 4817 Lake St., Melrose Park, Ill., will cover the northeastern portion of the State of Illinois, consisting of 10 counties, and Lake, Porter, and LaPorte counties in Indiana.

Western Contractors will also handle the *Lima* Austin - Western crushing, screening, and washing equipment, which is built at Lima.

Kensington Steel, Division of Poor & Company, Chicago, Ill., has appointed DAVID K. BAUHAN as sales engineer in Maryland, Virginia, and North and South Carolina. Mr. Bauhan will assist Joseph F. Milmine in representing Kensington in southeastern coastal states.

JAMES B. STOKES has been named sales manager for Mobile Drilling, Inc., Indianapolis, Ind. Mr. Stokes will be responsible for sales policy, promotion, and training. His immediate objective is the expansion of Mobile's dealer-distributor network.

Mr. Stokes joined Mobile Drilling in 1954 as an engineer. In 1955 he was promoted to chief engineer in charge of research and development, and in 1956 became plant manager and then sales engineer.

G. H. OLSON, vice-president and director of the Link-Belt Speeder Corporation, Cedar Rapids, Iowa, subsidiary of the Link-Belt Company, Chicago, retired on July 1 after 47 years of service. Mr. Olson is one of the most widely-known individuals in the power crane and shovel industry.

In 1910, Mr. Olson began his career with the Pershing Road plant of the Link-Belt in Chicago as a clerk. By 1920 he had become assistant to the manager of the company's Crane Department, and by 1923 he was sales manager to the Crawler and Locomotive Crane Department. From 1928 to 1939 he was manager of the Shovel and Crane Division.

In 1939 he was appointed secretary of Link-Belt Speeder Corp., which was formed by the consolidation of Link-Belt's Shovel and Crane Division with the Speeder Machinery Corp., Cedar Rapids, Iowa, manufacturer of crawler shovel-cranes. In 1944, Mr. Olson was made vice-president for sales of Link-Belt Speeder, and moved to Cedar Rapids in 1946.

G. H. Olson

E. B. Falk

Appointment of E. B. FALK as manager of advertising and sales promotion has been announced by officials of the Twin Disc Clutch Company, Racine, Wis.

Mr. Falk joined Twin Disc in 1946 as sales correspondent, and progressively advanced to sales engineer, application engineer, installation engineer, and administrative assistant, General Sales Department.

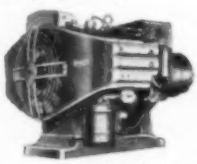
Basic Incorporated, Cleveland, Ohio, announces the recent appointment of W. H. TOCK as assistant to the chief engineer, George E. Stone. Mr. Tock has joined Basic to handle the engineering and delevopment of the special high-temperature kilns used by Basic in the manufacture of refractories and lime products.

Prior to his appointment at Basic, Mr. Tock specialized in the manufacture of refractories rotary kilns at Allis-Chalmers for 16 years. There he helped develop the kilns at Basic's Maple Grove, Ohio, plant.

Among the many unusual and specialized "rotaries" developed by Mr. Tock is the only kiln presently in use for producing Taconite. This kiln is in operation at the Oliver Iron Mining Division of U. S. Steel.

Onan Model 5DRP mounted on trailer with extension lighting standard.

Series 3DSP, 3,000 watts, single-cylinder.



Series 5DRP, 5,000 watts, two-cylinder, opposed.

Cut lighting costs with

Onan portable air-cooled Diesel Electric Plants

Make substantial savings on any job where extensive night-lighting is necessary by using Onan Diesel-driven electric plants. Diesel fuel has a big edge in economy and it's readily available on job sites. Onan Diesel plants are built for rugged service, with extra-large bearing surfaces, Stellite exhaust valve seats and other long life features. Engine and generator are direct-connected . . . no belts or couplings. Air-cooling eliminates trouble from freezing or leaking coolants. Compact and light weight. Put an Onan Diesel Plant on your next job and check the savings.

Diesel Plants—3,000 and 5,000 watts.
Gasoline Plants—500 to 75,000 watts.

Write for folder

Onan ELECTRIC PLANTS

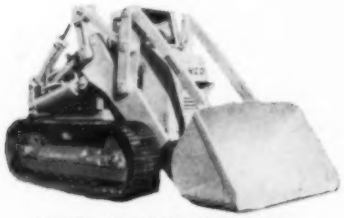
D. W. ONAN & SONS INC.

3773 University Ave. S.E., Minneapolis 14, Minnesota

When your spotting system is arranged to take full advantage of the Eimco 105 Excavator's ability to complete a cycle without turning... its loading capacity per $ of investment and maintenance can exceed that of conventional loaders or boom shovels by as much as 400%.

EIMCO 105 TRACTOR MOBILITY GETS *EXTRA* CAPACITY

Power shifting... operating simplicity... independent track reversal.. forward operating position... low center of gravity... are five important reasons why the Eimco 105 Tractor gets "extra" performance from its overhead or front-end loaders.



EIMCO 105 FRONT-END LOADER
2½ yard... 40,000 lb. break-out

EIMCO 105 EXCAVATOR
1½ yard... Overhead discharge

Eimco Unidrive, power-shift transmission combined with torque converter fluid drive, saves seconds every cycle and eliminates downtime due to burned facings or other clutch troubles. Without taking your left hand from the wheel, you simply manipulate power-shift levers for high, low, forward, reverse while the tractor is moving under full load. There's no reaching, no gear clash, no hesitation.

Independent track reversal is especially advantageous in front-end loading. It permits this 105 to pivot sharply from the muck pile and get material into trucks faster. It gets either loader out of trouble quickly... a big factor on hazardous jobs.

A 105 operator is always "on top of his work". Without standing or "craning" his neck, he can see to attack the muck pile at the best spot for fast loading. This, combined with operating ease, greatly reduces fatigue... gets greater man-hour efficiency.

Low center of gravity gives the 105 tractor extra stability... permits it to traverse 100% grades without tipping.

This combination of extreme tractor mobility and one of two high utility loaders, gives you a wide choice in adapting an earth-moving technique most profitable for your job requirements.

An Eimco Sales Engineer will help you decide which model fits into your job scheme most profitably.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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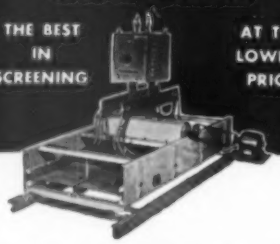
B 276

UNIVERSAL

THE BEST IN SCREENING

AT THE LOWEST PRICE



THE MOST MODERN AND EFFICIENT ELECTRIC HEATING EQUIPMENT AT A REASONABLE PRICE

- VIBRATING SCREENS — All sizes and types.
- UNILEC HEATING EQUIPMENT
- UNIFLEX VIBRATORS
- UNIVIBE RIDDLES

WRITE FOR NEW CATALOG No. 150.

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

The appointment of PHILLIP B. HARRITY as employee relations manager of the Axle Division of the Eaton Manufacturing Company, Cleveland, Ohio, was announced recently.

Mr. Harrity joined Eaton in June of this year after having served as personnel director of Standard Thomson Corp., Dayton, Ohio.

Two other appointments were also announced. HOWARD M. THOMPSON was promoted to the staff of the central industrial relations department in Eaton's general office, and SHEPARD T. SHEDDEN, assistant employee relations manager at the Axle Division, was also appointed training director.

Appointment of D. H. MITCHELL as eastern sales manager for the LeTourneau-Westinghouse Company, Peoria, Ill., has been announced by officials of the firm. The appointment places Mr. Mitchell in charge of operations of the company's eastern sales division, which includes 21 states and 4 Canadian provinces.

Mr. Mitchell replaces JAMES A. VINCENT, who recently resigned to become vice-president and general manager of the Adams Construction Equipment Company, a new Le Tourneau-Westinghouse distributorship being organized in the state of Florida.

Mr. Mitchell entered the construction equipment field in 1949, when he joined the J. D. Adams Manufacturing Company, Indianapolis, Ind., serving as sales correspondent, and later as eastern division manager.

When LeTourneau-Westinghouse purchased the plants and manufacturing facilities of the Adams Company in 1955 and organized the LeT-WesCo Adams Division, Mr. Mitchell was assigned as a member of the sales training staff. Later, after conducting a series of sales schools throughout the United States and Canada, he was named district representative for the company in Virginia and the Carolinas, the position he has held until his present promotion.

D. H. Mitchell

A. G. Forssell

ALFRED G. FORSSELL, consulting engineer for the Morris Machine Works, Baldwinsville, N. Y., retired on July 6 after 35 years with the firm.

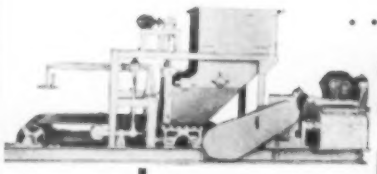
Mr. Forssell, recognized as one of the foremost authorities on pumping of slurries and dredge operations, served as president of the Morris Machine Works for five years, until his resignation in 1954. At that time he became consulting engineer for the firm.

The Mine and Smelter Supply Company, Denver, Colo., and its subsidiary, the Colorado Iron Works, have just completed a million-dollar expansion program which includes a new office building and additional shop facilities in Denver. The new plant will permit more efficient and increased production of Wilfley tables, Massco-Grigby pinch valves, and laboratory equipment. It is an addition to the 230,000 sq. ft. shop where Marcy Mills and Akins Classifiers are manufactured.

Included in the expansion program is a new research department with facilities and personnel for extending their research and testing activities.

PRODUCTION and PROFITS } shift into HIGH!

. . . when you install



SCHAFFER POIDOMETERS

for scaling Bulk Materials

OVER 1500 now serving Industry

Write for Catalog No. 5

Raw and finished bulk material plants need fast, accurate, automatic SCHAFFER Poidometers in the scaling department to reach peak efficiency.

The operation may involve weighing, blending, mixing, feeding, recording, or proportioning. In any case, Poidometers supply valuable weight-information, promote product uniformity, and help to keep production lines open.

Durably constructed for continuous, economical service, these units insure maximum output and profit records.

Available with remote control devices for showing and changing feed rate, and total weight recorders.

SCHAFFER POIDOMETER CO.
2828 Smallman St., Pittsburgh 22, Pa.

ANACONDA WIRE & CABLE COMPANY

INTER-OFFICE CORRESPONDENCE

COPIES TO:

G 4804

TO: Fred Luna

DATE July 1, 1957

FROM: W. E. Sprackling

OFFICE Hastings

SUBJECT: ADVERTISING

REFERRING TO: Quality Control Inspection - ETL

FILE REFERENCE:

Fred, we've been telling our customers about our methods of Inspection, our Quality Control, and other manufacturing safeguards. But perhaps we're missing a bet. I think the BIG THING is what the Electrical Testing Laboratories, Inc. does for us -- not just the fact that they calibrate all of our testing equipment (that's quite common), but that they actually go through our test reports at all mills annually to see that our testing system is functioning the way management planned it.

I don't think any other outfit goes so far as to have such a complete independent audit. To me -- that's newsworthy -- our customers should know that we have an outside agency -- fully competent -- to watch after their interest.

Why not tell our story broadly -- after all, it's to the customers' interest -- they will appreciate, I'm sure, what is being done for them.

W. E. S.

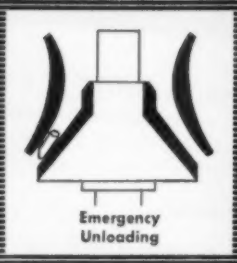
P. S. And another important thing -- the inspection department is entirely separate and independent of production -- reporting only to the Vice President in Charge of Manufacturing.

JEF - What more could we say? Sin for running this as is. What do you think? Fred

OK - JEF

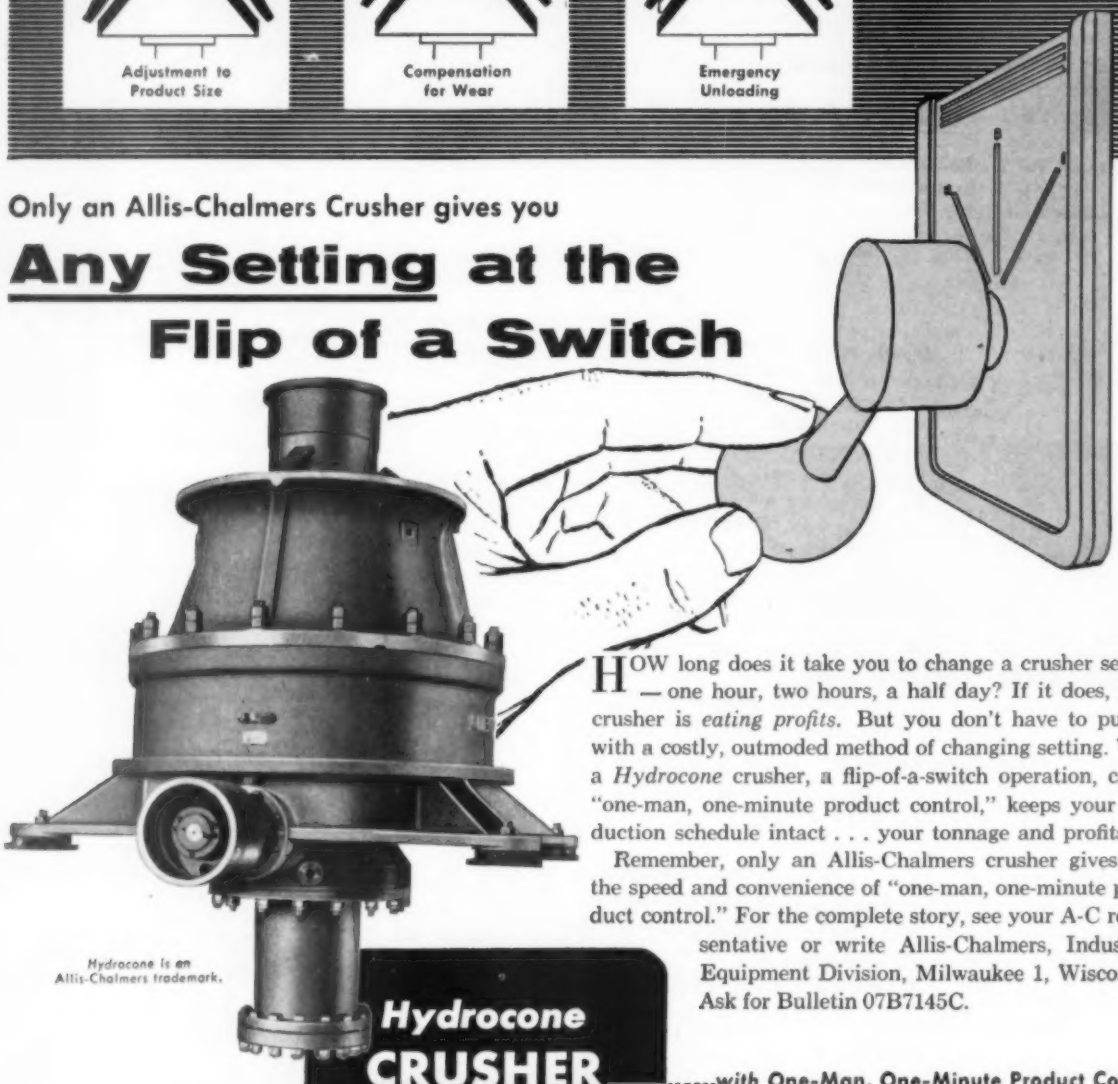
57422

LIVE BETTER ELECTRICALLY



Only an Allis-Chalmers Crusher gives you

Any Setting at the Flip of a Switch



HOW long does it take you to change a crusher setting — one hour, two hours, a half day? If it does, your crusher is *eating profits.* But you don't have to put up with a costly, outmoded method of changing setting. With a *Hydrocone* crusher, a flip-of-a-switch operation, called "one-man, one-minute product control," keeps your production schedule intact . . . your tonnage and profits up.

Remember, only an Allis-Chalmers crusher gives you the speed and convenience of "one-man, one-minute product control." For the complete story, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B7145C.

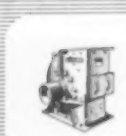
Hydrocone is an Allis-Chalmers trademark.

Hydrocone CRUSHER.....*with* One-Man, One-Minute Product Control

ALLIS-CHALMERS

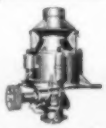
A-C ALLIS CHALMERS

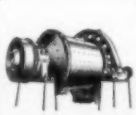
A-5260


Hammermill

Vibrating Screen

Jaw Crusher


Gyratory Crusher


Grinding Mill

Kiln, Cooler, Dryer

"Our Bucyrus-Erie 38-B is easy to operate and very cheap to run. We experience very little downtime and have had no serious breakdown. It really stands out for ruggedness, power, and consistent performance," says Lee Courtney, quarry superintendent for Standard Industries, Inc., Aggregate Division, Tulsa, Oklahoma. The 1½-cu. yd. shovel is loading limestone from a 35-ft. ledge in Standard's East Tulsa quarry.

Bucyrus-Erie teamwork satisfies pit owners

Top output plus daily dependability that keeps stripping and loading operations going at a profitable pace shift after shift, year after year — that's why experienced pit owners prefer convertible Bucyrus-Erie excavators. These men recognize excavator quality — simple strong design; durable long life construction; easy smooth operation; and low-cost maintenance.

They take full advantage, too, of Bucyrus-Erie's after-the-sale bonus: unmatched prompt, reliable service. Distributor facilities are conveniently located in over 100 cities throughout the United States and Canada. Trained service personnel, factory-approved service equipment, and complete stocks of Bucyrus-Erie parts are available to keep machines in top performing condition.

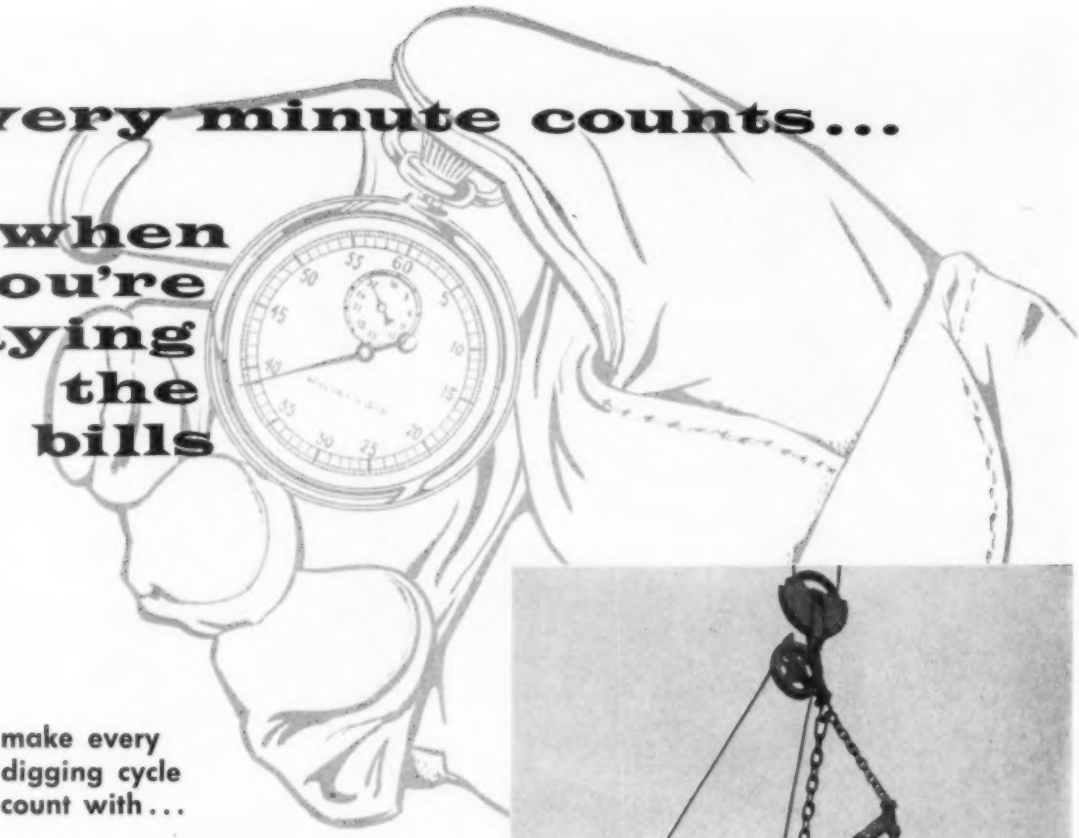
In shovel and dragline needs, this kind of manufacturing, sales, and service teamwork assures pit owners the best. Drop in soon at the Bucyrus-Erie distributor near YOU — he'll be glad to help you select the right machine for your pit from a range of sizes from ⅜ to 4 cubic yards. For information on larger size machines, write direct. 379E57

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Every minute counts...

when you're paying the bills



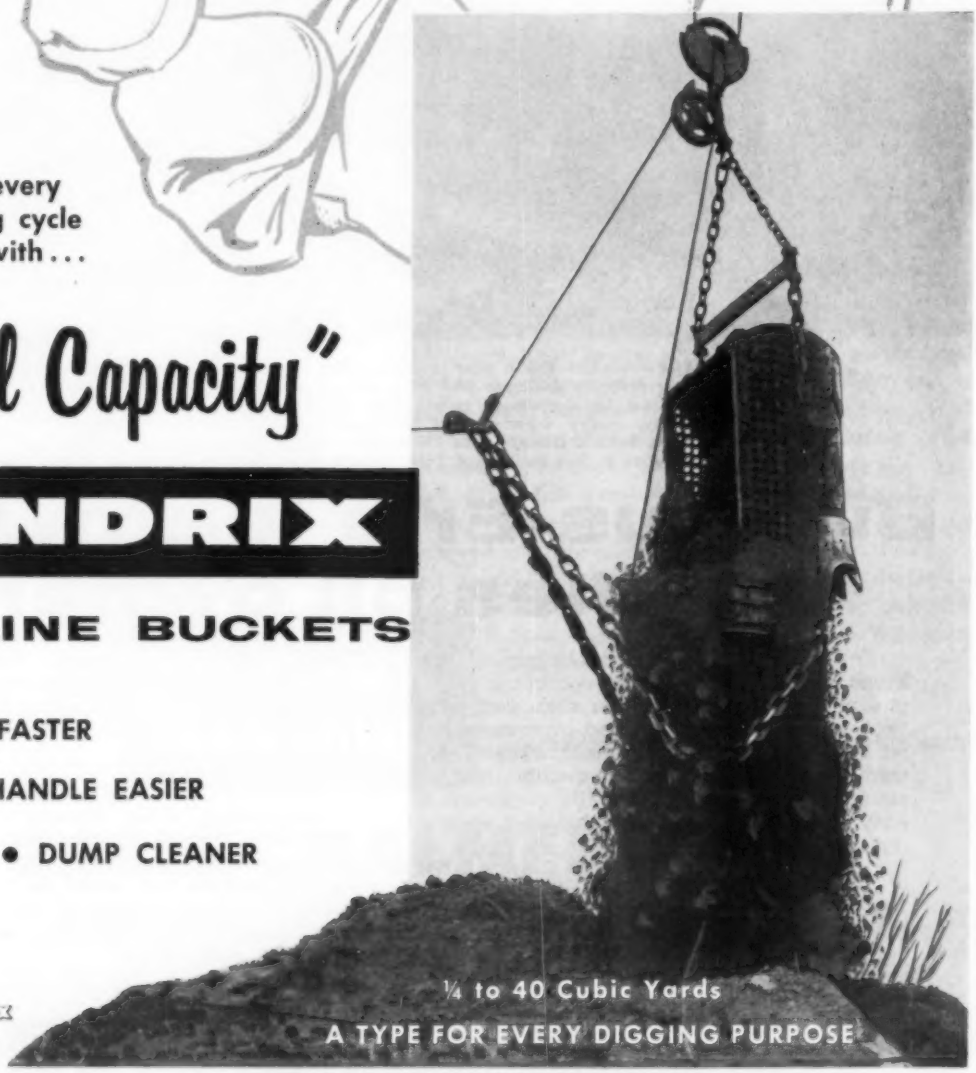
make every digging cycle count with...

"Full Capacity"

HENDRIX

DRAGLINE BUCKETS

- FILL FASTER
- HANDLE EASIER
- DUMP CLEANER



¼ to 40 Cubic Yards

A TYPE FOR EVERY DIGGING PURPOSE

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

HAULS 4,000 TONS OF ROCK DAILY

ERROR

This ad, which appeared in June 1957, contains an obvious error. The 4,000 tons mentioned was the total amount hauled daily by *all three* Rear-Dumps . . . not the amount per machine. LeTourneau-Westinghouse Co. believes in truthfulness and integrity in its business dealings with its customers and prospects. In keeping with this policy we offer our apology for this misleading statement.

Tournapull operator backs Rear-Dump up to edge of crusher, and flips electric hoist-switch. As body raises, rocks are dumped fast and safe. Body swings below and behind rear wheels, so rocks cannot obstruct wheels.

An abundant supply of base material was vital to Broce Construction Co., Dodge City, Kansas, when they began putting an 18″ base on a 10-mile section of highway. Nelson Bros. Quarries, La Harpe, contracted to supply Broce with more than 400,000 tons of stone and sand for necessary base material. In order to maintain the continuously high rate of aggregate production needed, Nelson Bros. relied on their 3 high-speed, 22-ton LeTourneau-Westinghouse C Tournapull Rear-Dumps. These fast-stepping haulers high-balled material from pit to crushing plant . . . hauled 4,000 tons of blast-rock daily per machine.

Note big 22-ton rock load in heavy, welded-steel Tournapull Rear-Dump body. On this rugged pit job machines successfully withstood much of this hard pounding.

Average 22 tons of rock per load

At Nelson Bros.' quarry, 3 mi. northwest of Reading, C Rear-Dumps worked with 2½-yd. shovel. Their short 90° turn radius enabled operator to maneuver machines easily, and spot fast under dipper. Each L-W Rear-Dump was loaded with 22 tons of blast-rock in 1¼ min. Rear-Dump's wide 8′9″ bowl, with low rear-entry, provided large, easy target area for shovel operator . . . reduced spillage and clean-up. Since shovel operator did not have to "lift" dipper high to get in and out of bowl, he saved valuable time on bucket's swing-cycle. This, plus time saved in hauling, maneuvering, and dumping, enabled Rear-Dump to make more round-trips . . . haul more tonnage per working-day.

Big brakes add safety on downhill hauls

'Pulls' multiple disc air brakes on all 4 wheels provided 3,762 sq. in. of braking surface for safe hauling on down-grades. At crusher, operator swung in fast . . . set rear-wheel brakes . . . and touched electric switch on control panel to activate hoist-motor and raise body. As bowl tilted, it swung discharge lip below and behind rear wheels . . . kept rocks from slipping underneath wheels as Rear-Dump fed load directly into crusher.

"These machines beat anything"

Supt. Carl A. Nelson reports his Tournapull haulers work profitably and efficiently. He said, "We have had excellent service from our Rear-Dumps. They haul from quarry pit to crusher, and have to take abuse on that type of work — but they are plenty rugged to take it." Nelson added, "They have plenty of power . . . can say we've had trouble-free service. We've worked all winter, in all kinds of weather. We can always depend on quick, easy starting on coldest days. These machines beat anything I've seen."

Heavy-duty haulers for tough jobs

For rugged, heavy-duty haulers to handle those tough jobs at your quarry, investigate the advantages of Tournapull Rear-Dumps. They take rough treatment . . . give you continuous high production. Call or write us for complete details.

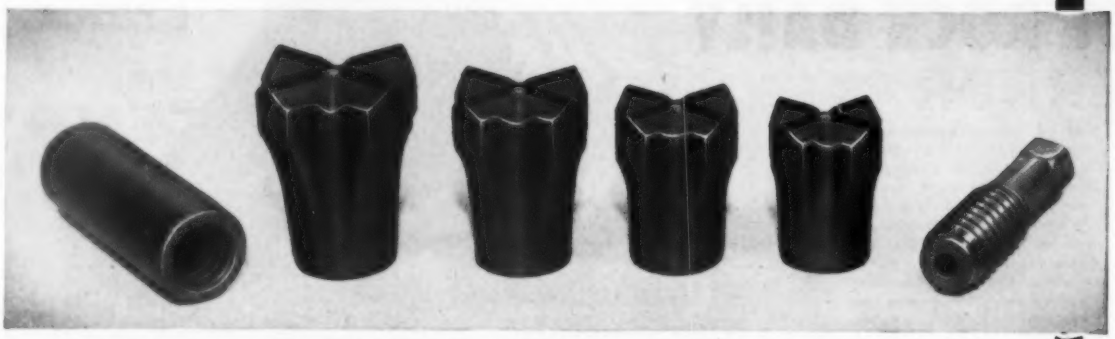
Tournapull—Trademark Reg. U.S. Pat. Off. CR-1195-Q-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

BRUNNER & LAY "600" ROK-BITS



"600" Coupling | 3½-In. "X" Rok-Bit | 3-In. "X" Rok-Bit & Cross | 2¾-In. "X" Rok-Bit & Cross | 2½-In. "X" Rok-Bit | 6-D "600" Thread

Brunner & Lay "600" carbide Rok-Bits® designed to fit directly on "600" series extension drill rods. No adapter needed! Rok-Bits' "X" design eliminates rifling, gives you a ROUND hole to load. Wider chip channels permit discharge of more and larger chips. Order from your distributor—if he cannot supply you, contact our nearest plant. Write for Catalog #756!

Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St. Franklin Park, Ill. • Brunner & Lay Rock Bit of Philadelphia, Inc., 2514 East Cumberland St., Philadelphia 25, Pa. • Brunner & Lay of Los Angeles Inc., 2425 East 37th St. Los Angeles 58 Calif. • Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas • Brunner & Lay Rock Bit of Asheville, Inc., Sweeten Creek Rd., Asheville, N.C. • Brunner & Lay of Portland, Inc., 660 N. Tillamook St., Portland 12, Ore. Birmingham Rock Bit Co., Inc., 5-18th St., S.W., Birmingham, Ala. • Brunner & Lay, Inc., 2 Santa Fe Drive, Denver, Colo. • Brunner & Lay (Canada) Ltd., 6301 Cote de Liesse Road, Dorval Station, P.Q., Canada.

PIT and QUARRY HELPS YOU OPERATE MORE PROFITABLY

Every issue of PIT AND QUARRY is full of information you can use in your business. It gives you ideas on every phase of your operations.

To keep its readers fully informed, PIT AND QUARRY taps every source. Our field editors travel more than 30,000 miles a year to describe the processes and methods used by the outstanding plants making your type of product. Government activities affecting the field are interpreted so that you can better adjust your business to their regulations. Complete reports of all important conventions are published in PIT AND QUARRY.

New equipment and supplies which make production more efficient are announced in each issue.

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My Name.....Title.....

Company Name.....

Send to (address).....

We produce.....

Hendrick, Pioneer Perforator of special quality steels for over 81 years, can really cure your vibrating screen problems! Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry plus their unlimited experience in perforating plate gives you a combination **1+1=2** that can't be beaten! Hendrick Perforated Plate not only stands up longer, but affords more accurate sizing. No other screening medium can compare to it for maintained uniformity of mesh, for non-blinding clearance and for long trouble-free life. For details write to Hendrick, today!

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals.

Hendrick MANUFACTURING COMPANY
39 DUNDAFF STREET
CARBONDALE, PA.

Looking for Used Equipment?

Try Pit and Quarry's
Broadcast Section
PAGES 181-189

"The Marketplace of the Industry"

Auto-Vortex Classifiers are delivering sharp gradations and recovering fines . . . at lower operating costs . . . in hundreds of installations all over the country.

CHARLES E. WOOD CO.
AUTO VORTEX CLASSIFIERS
906 N. WATER ST. • MILWAUKEE 2, WIS.

WE'D LIKE TO SOLVE YOUR CLASSIFICATION PROBLEMS. WRITE TODAY!

$64 ANSWER to Wear-Resistance Problems

ADMIRO
HEAT TREATED ALLOY STEEL

Recommended Applications: Relining and repairing truck beds, crushers, chutes, bins, hoppers, rock recovery equipment. Special uses in Mining, Quarrying, Cement and Aggregate Plants.

Write for Bulletin

THAT'S RIGHT—ADMIRO Heat Treated High Tensile Alloy Steel efficiently protects buckets against severe abrasion and heavy impact. Throughout industry, experienced operators standardize on ADMIRO to boost machine service life and reduce expensive down-time. Wherever used ADMIRO assures lower repair and maintenance bills.

COMPLETE FABRICATING FACILITIES

Welding—Rolling—Forming

Intricate Shapes Cut to Specification

ADMIRAL ALLOY STEEL CORP., 850 Euclid Ave., Cleveland 14, Ohio
ADMIRAL ALLOY STEEL CORP. of Texas, 2802 Rector St., Dallas 15, Texas

Teleramic ON THE JOB in Illinois

Chicago Construction Company Reports . . .

This Anthony Frameless Trailer Hauls One Extra Ton Per Load!

● During a 17 week test period of steady rock hauling; this Anthony Frameless Trailer proved itself *better in performance and more profitable to operate* than similar equipment used on the same jobs. This was the report from Consumers Company of Chicago, Illinois which is currently using this Anthony Frameless Trailer on major paving jobs in the Chicago area. Here are the conclusions they reached after a careful study of the facts:

❶ Anthony Frameless Trailers (lighter than similar hauling equipment) carry at least 1 extra ton in each payload over standard equipment.

❷ In all other hauling and dumping operations, Frameless Trailers equal or exceed similar hauling equipment.

❸ It is almost impossible to get bogged down with an Anthony Frameless Trailer. If the trailer is stuck, the driver sets his tractor brakes and raises the Teleramic Hoist. If the tractor is stuck, the driver sets his trailer brakes and lowers his Teleramic Hoist.

BUY THE DUMP BODY THAT HAS THE SERVICE

Over 100 Anthony Distributors are located nationwide. At least one is convenient to you . . . ready to give immediate service on all Anthony equipment.

Complete descriptive literature is now available on Anthony Frameless Dump Trailers and Teleramic Hoists. No obligation, of course! Just write

IT'S NO SECRET!

The Teleramic "V" Seal Hoist Is A Major Factor In Frameless Trailer Success

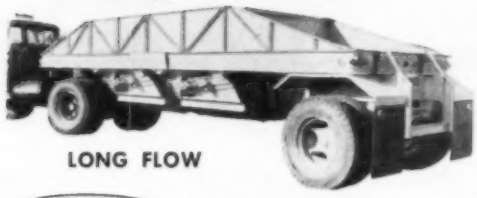
Proven "V" seal packing is only one of many quality features in the Teleramic Hoist design. Because the dry operating "V" seal is self-adjusting, repacking or manual adjustment of the Teleramic cylinder is very rarely needed. "Truss rings" encircle and reinforce the ends of each cylinder tube to prevent "flaring." Extra long bronze bearings and long overlap of the cylinders help keep them perfectly aligned.

Write: 1755 Baker Street, Streator, Illinois

ANTHONY COMPANY, STREATOR, ILL.

INCREASED PAYLOADS EASIER UNLOADING

CROSS FLOW



LONG FLOW

OMAHA STANDARD **CENTER DUMP TRAILERS**

Built to give you greater production at less cost. In all yardages — for any material, single or tandem axle. Single or double hopper. Write now for full information.

Distributorships Available in Some Areas

"Custom-Made Material Trailers — for ANY Commodity"

OMAHA STANDARD
2401 W. Broadway, Council Bluffs, Iowa

FREE to Every Shop Operator

- Diesel Compression Testers
- Nozzle Testers for American Bosch, Caterpillar and Bendix Nozzles
- Cummins Injector Tester
- International Harvester Injection Testers
- General Motors Injector Testers
- Injection Pump Calibrating Stands
- Nozzle-Injector Cleaning Tools and Lapping Blocks
- Engine Overhaul Stands
- Engine Removal and Parts Dollies
- GM 71 Engine Tools

76 Pages—275 Illustrations
56 Engine Reference Tables
26 Parts Lists

SEND COUPON NOW

Bacharach Industrial Instrument Co., 200 N. Braddock Ave., Pittsburgh 8, Pa.
Send us FREE copy of your Diesel Shop Manual AD54

We are: ☐ Fleet Operators ☐ Injection Service Shop ☐ Diesel Manufacturers ☐ Parts and Engine Distributors

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STREET_____

CITY and STATE_____

AD-15

Meet a Packaging Problem -Solver

Years of experience in the Multiwall field, backed by vast paper resources and extensive manufacturing facilities, assures you a *practical* answer to your packaging problems. Let a Raymond Representative show you how with a Raymond Multiwall!

Raymond BAG CORPORATION
Division of Albemarle Paper Mfg. Co.
MIDDLETOWN, OHIO • RICHMOND, VIRGINIA

DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
9th Ave. at 4th, Mendota, Illinois

H&L Teeth that really dig!

H&L TOOTH COMPANY
1540 South Greenwood Avenue Montebello, California

NEW, ECONOMICAL STEEL

WINCAR "J" BUCKETS

FOR ALL ELEVATOR APPLICATIONS!

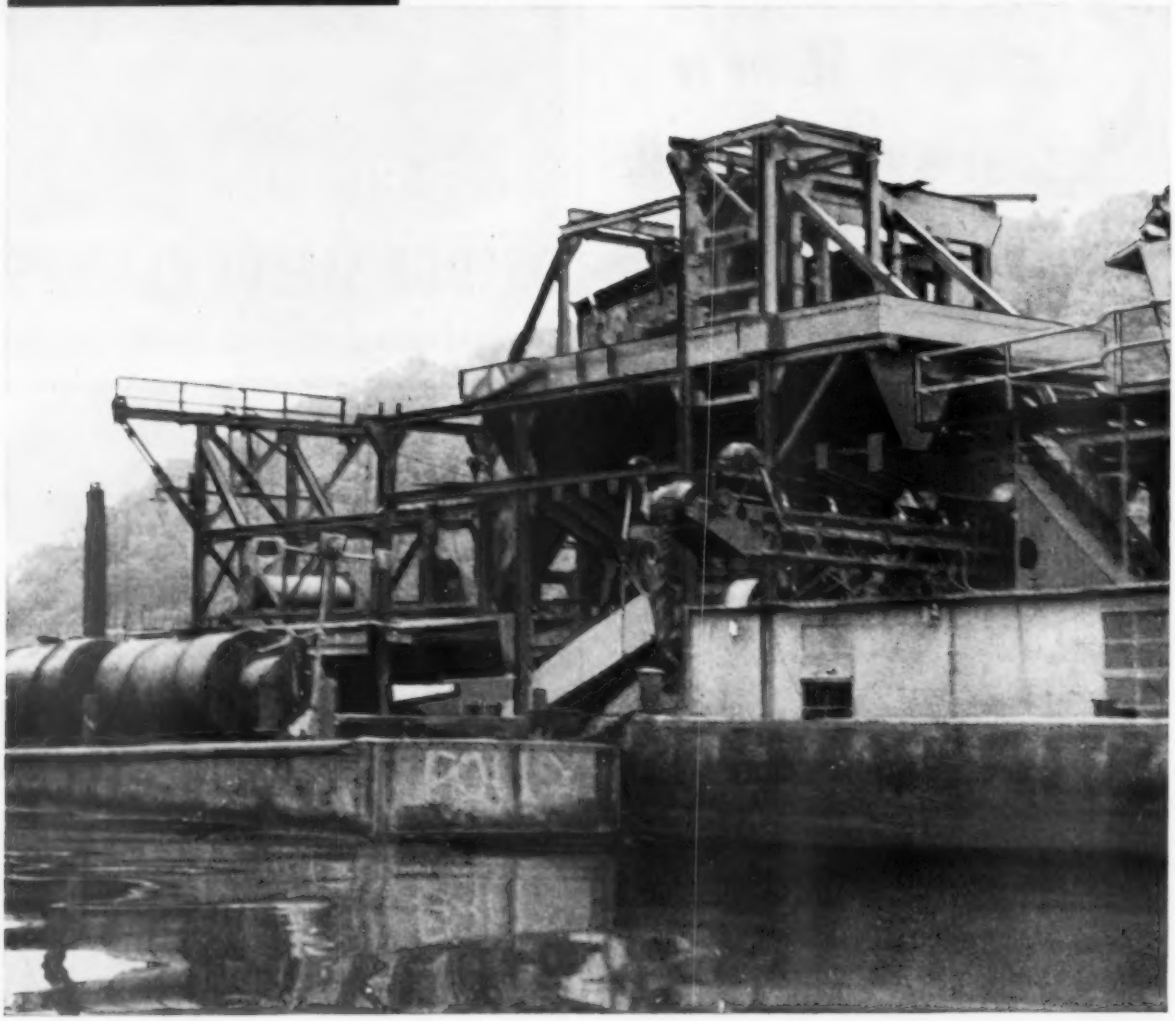
Here's the newest cost-saver in the industry... elevator buckets fabricated from a single steel plate ...*lighter, stronger, tougher* and *long wearing!*

Wincar "J" Buckets feature smoothly rounded corners; freedom from corner welds and irregularities; fast, clean discharge, plus worthwhile savings in first cost! Available in standard types and sizes; special shapes on order. Write for our circular and prices!

Some Sales Territories are still open. Dealer inquiries invited.

WINCAR WELDERS
3249 Cherry Ave., Long Beach, Calif. • Telephone GArfield 7-0946

Amsco pump application file at: Duquesne Sand Company, Pittsburgh, Pennsylvania



"We seem to use fewer impellers in our Amsco Pump . . ."

"Amsco® makes a fine, well-designed pump." These are the words of Maintenance Superintendent Andrew Crain of the Duquesne Sand Company. "Delivery of parts for Amsco pumps is also fine," says Mr. Crain.

Duquesne's dredge, Admiral, works the river bottom below Pittsburgh, using a five-year-old Amsco pump. Materials vary, averaging 40% sand, 60% gravel and some clay and rock.

Duquesne's Swintek ladder may go as deep as 45 feet, with an extra 15-foot lift and an 87-foot discharge line.

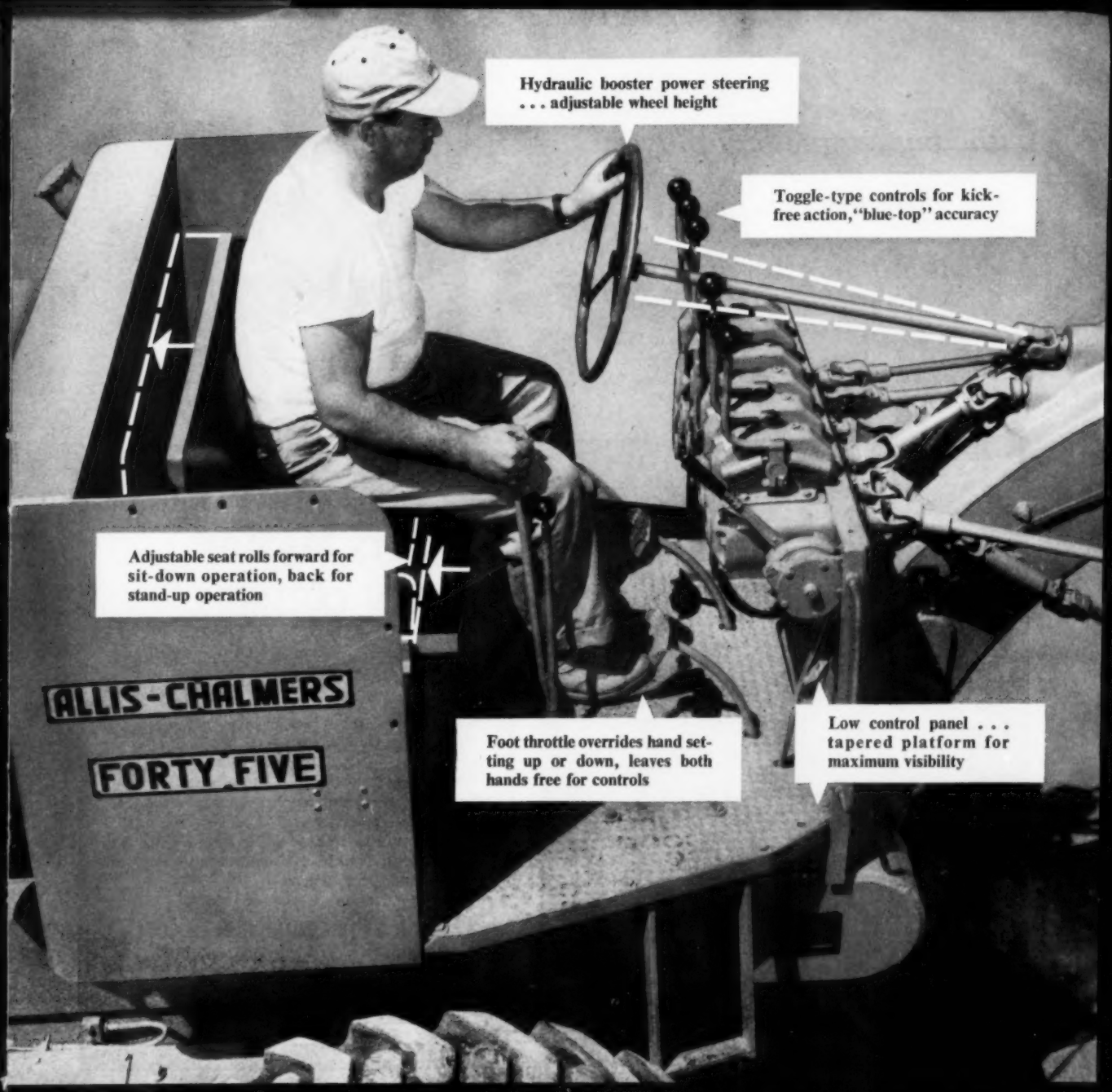
The pump operates around the clock. They use two shells per year, which are built up with Amsco Welding Rod during down periods. Lower bearing halves have been changed once—upper halves, not at all.

Quick Facts About Amsco Pumps

Whether your dredging operation is large or small, you can get an Amsco Dredge Pump to handle the job. Standard sizes range from 6″ to 20″ discharge openings. Larger sizes are also available. An Amsco pump engineer will be glad to discuss your requirements, or write for Bulletin 1052P, giving full information and specifications on the Amsco line.

AMERICAN Brake Shoe COMPANY

AMSCO American Manganese Steel Division
Chicago Heights, Illinois


Hydraulic booster power steering . . . adjustable wheel height
Toggle-type controls for kick-free action, "blue-top" accuracy
Adjustable seat rolls forward for sit-down operation, back for stand-up operation
ALLIS-CHALMERS
FORTY FIVE
Foot throttle overrides hand setting up or down, leaves both hands free for controls
Low control panel . . . tapered platform for maximum visibility

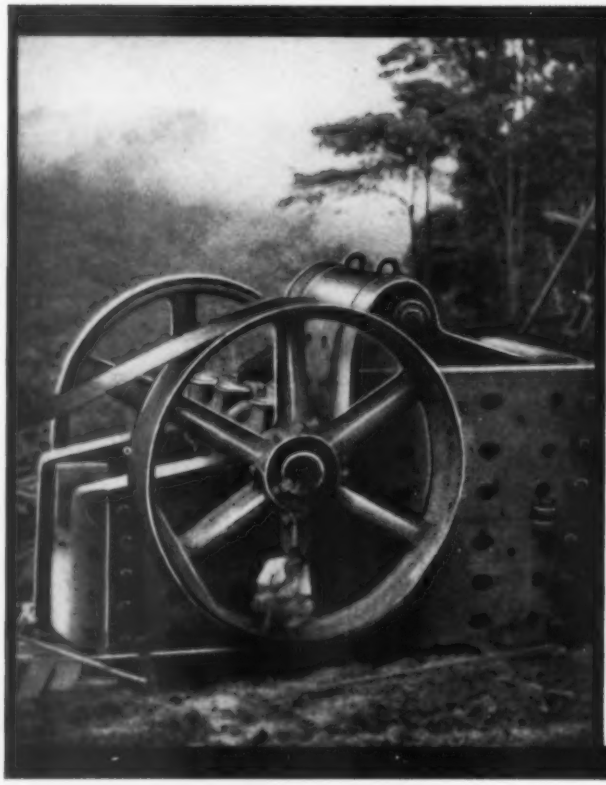
FIVE WAYS YOU CAN BOOST GRADER PRODUCTION

. . . through operator comfort and control!

Features like these make satisfied operators . . . mean more production for you. They're yours in an Allis-Chalmers FORTY FIVE—120 brake hp, 23,800 lb. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

the big league ball player has his equipment custom-made because he gets something **EXTRA**



the profit-wise stone producer

BUYS TRAYLOR JAW CRUSHERS for the same reason

For over half a century, rock producers have specified Traylor-made Jaw Crushers to insure extra hourly production with lower operating costs per ton. There are four types of Traylor-made Jaw Crushers to fit every primary breaking requirement. Feed openings range from 8″ x 12″ to 60″ x 84″; capacities from 4 to 1000 tons per hour. Write for Traylor Bulletin No. 11-120 containing complete descriptions and specifications.

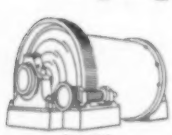
TRAYLOR ENGINEERING & MFG. CO.
975 MILL ST., ALLENTOWN, PA.
Sales Offices: New York—Chicago—San Francisco
Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

the experts agree . . . there's nothing like

TRAYLOR-MADE

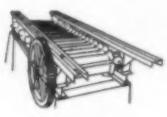
equipment for peak performance

A Traylor leads to greater profits


BALL MILLS

ROTARY KILNS

PRIMARY GYRATORY CRUSHERS


APRON FEEDERS

JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

Two Macks—one driver. One truck is on the move while the other is being loaded, for fast cycle operation from quarry to crusher.

"Our MACKS guarantee our production"

"Our stone-crushing operation is automatic, and to get full use out of it, we need trucks that can maintain a tight production schedule," reports Mr. Alexis Dyer who, with his brother Frank, owns and operates a 300-acre stone quarry near Reisterstown, Maryland. "And believe me, our 2 Mack LRX dumpers have done it, in spite of the rugged terrain they have to cover from loading to dumping."

The Dyers' Macks are loaded at the far end of the quarry with a 17 or 18 ton load. Then they cross the rocky, pock-marked bottom of the quarry, plowing their way through waterholes two feet deep, and climb a steep quarter-mile grade to the crusher.

The ability to maintain a tight schedule over this jarring terrain would be a harsh test for any truck. In fact, the Dyers' previous trucks broke down frequently, seriously handicapping their output. Now, with their Macks, the Dyers experience no trouble maintaining their schedule. A full day's production for the two Macks averages 1500 tons, with each truck using only 15 gallons of fuel per day.

James Williams, who drives these two Macks, likes their maneuverability. "They drive very well—no trouble at all," he says. "Another thing I like is that there is much less shifting than there was on our other trucks, which means I'm much less tired at the end of the day—even though I make 80 round trips daily from the quarry to the crusher."

The Dyers are enthusiastic about their Macks and are planning to purchase another one in the near future. If you need help with a heavy hauling job, why not see your nearest Mack representative for full information. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

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GET HIGH QUALITY AGGREGATE
from low grade sources

WEMCO HMS (Heavy Media Separation) can remove deleterious material such as shale, chert, soft-stone, wood and coal from low grade deposits. The finished product is specification aggregate universally accepted for concrete that must stand up under severe outside exposure. The cost of HMS treatment can be far less than the transporting of material from more distant sources.

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Write today for further information

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These 3 big features will mean more to you in profits than anything you can find in any other 2½-yd. shovel-crane. They mean greater operating ease, longer life, increased crane capacities and reduced maintenance. Of course, there are many more features in the Lorain-85A . . . torque converter power-take-off, new "operator designed" cab, full air controls of all crawler operations, removable counterweight, are but a few. The Lorain-85A is years ahead in the important features that will put you 'way ahead in profits.

Be sure you know all about the "85A" . . . your Thew-Lorain Distributor will explain every detail!

ST. CHARLES QUARRY of St. Charles, Missouri, puts the big power of a 2½-yd. Lorain-85A Shovel on tough rock digging. Note the operator at the 2-lever, "Joy-Stick" air controls . . . the simplest, easiest, most effortless operator controls on any shovel-crane. Production gets a boost—and the operator gets a break with the new Lorain-85A.

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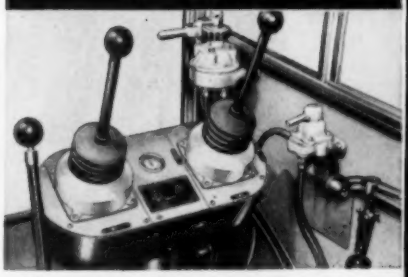

The newest of all shovel-crane power controls. "Metered Air" feeds power to clutches at any rate desired — yet operator retains full "feel" of all operations. Fewer levers, fewer motions, faster, smoother, less effort, less fatigue.

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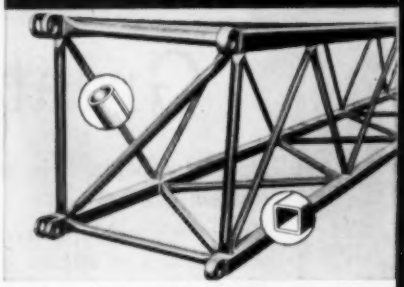

Reduces boom weight and increases lifting capacities. 40 to 48-ton crane capacities on general-purpose crawler . . . 50 to 60-ton on larger, wider crawler . . . up to 200 ft. boom, plus 40 ft. extension available.

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That is why the present tasks of our colleges and universities are of vital concern to *every* American. These institutions are doing their utmost to raise their teaching standards, to meet the steadily rising pressure for enrollment, and provide the healthy educational climate in which great ideas may flourish.

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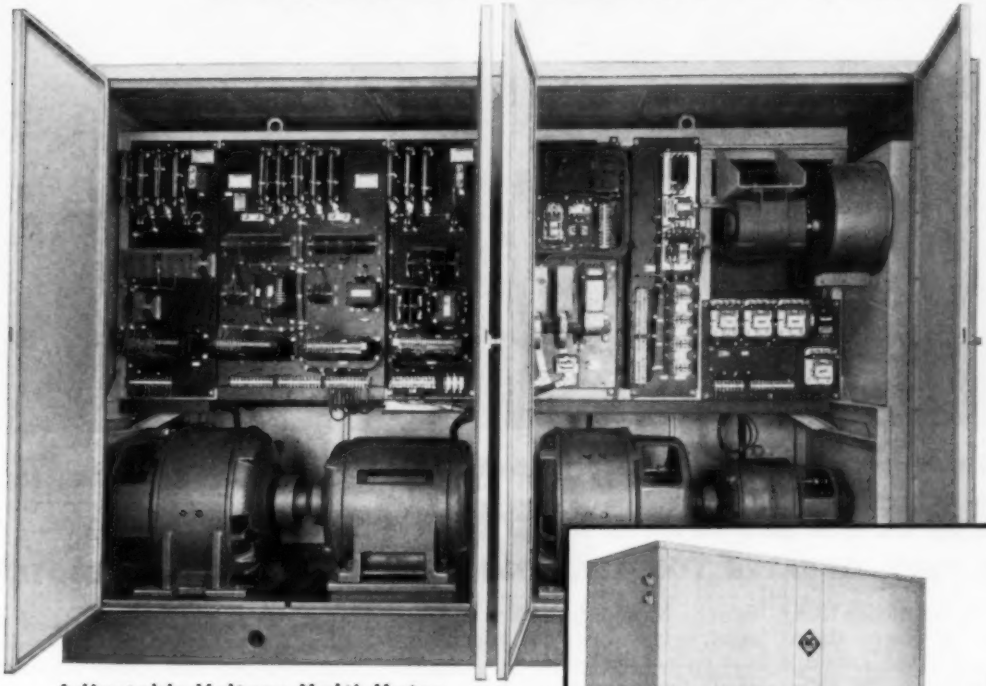
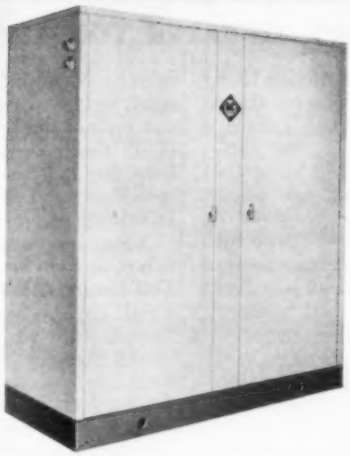


Adjustable Voltage Multi-Motor Package Drive is ideal for many industrial applications. Self-ventilation keeps unit clean, minimizes maintenance.



Size 3 Adjustable Voltage Power Unit rated 30 hp, of standard construction. Magnetic amplifier excitation provided.

Every one of the design features of the Allis-Chalmers Adjustable Voltage Package Drive assures you an easy, dependable means of power conversion.

Key to Package Drive dependability is the use of a magnetic amplifier to excite the field of the power unit m-g set. Sturdy and simple, this amplifier has no moving parts to wear out . . . no fragile components to be affected by vibrations. AND — there's no wasteful "warm-up" time needed. At the turn of a dial, you get immediate speed control.

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Available in units from 5 to 200 hp, the package drive is ideal for any application requiring adjustable speed. Contact your nearby Allis-Chalmers sales office or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

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GIVE US 100% GREATER TON-LIFE AND MORE UNIFORM AGGREGATE"

Producing a quarter of a million tons per year of what an official state testing agency calls "the hardest stone in Massachusetts," the Ashland division of Bayer and Mingolla has to have screens that can withstand severe abrasion.

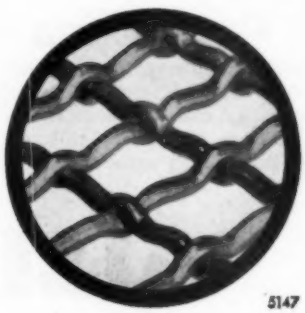
"That's why Super-Tempered Screens are standard replacements for the original equipment supplied on our crushers," says Mr. Richard Bayer, the division's plant superintendent. "In spite of the fact that they are used to process blue trap rock, granite, hard basalt and other types of hard stone, Super-Tempered Screens consistently handle 80,000 tons or more of rock without a split, and some last as high as 100,000 tons!

"In addition," Mr. Bayer continues, "we find that Super-Tempered Screens constantly deliver uniform sizes, reduce waste and rejects, cut our replacement time to a fraction of its former cost, eliminate problems due to screen whipping under rock flow, and lower our downtime as a direct result of their longer life."

About accuracy, Mr. Bayer points to a recent job for the Massachusetts Toll Road Authority, where the material supplied had to pass rigid "per cent by weight passing through screen" tests. "On ⅜" stone top for bituminous concrete, retention on a #200 screen could not exceed ½ of 1%. And similar stringent requirements were set up for the other sizes of aggregate supplied for this job. When we submitted samples, the official testing agency said we were getting *perfect* uniformity, which is, in our opinion, something of a record for any contractor. We credit the accuracy of Super-Tempered Screens with a major part in this record," Mr. Bayer concludes.

Super-Tempered Precision Space Screens give such long, accurate service because they are made of a special wire that's oil quenched for extra toughness . . . crimped to precision standards . . . and woven extra tightly on heavy-duty hydraulic looms.

Why not get complete details on how you can take best advantage of Super-Tempered Precision Space Screens in your own operations? Contact our nearest sales office today.



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1—electric manual control lock, A-B, 200 HP, SEC. amps 146, Sec. volts 600
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Above 4 items $1250 complete
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2—Bartlett & Snow 7′ x 30′, 6′ x 30′ direct heat Rotary Dryers complete with feeders, blowers, motors, 304 S.S. Clad 17′ from feed end.
1—Raymond 16′ dia. single whizzer Mech. Air Separator, 50 HP motor.
2—Tyler Hummer 3′x15′, Type 38 single deck Screens with Thermionic Units.
5—Bartlett & Snow, totally enclosed Bucket Elevators 28′ x 55′ centers, 8″ x 5″ buckets, motor driven.
1—Link Belt totally enclosed Bucket Elevator 51′ centers, 14″ x 7″ buckets, motor driven.
150′ Screw Conveyor 14″ and 18″ dia. with steel troughs and covers.
1—Rectangular Two-Compartment Bin 22′8″ long x 20′6″ wide x 18′ deep.

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Salary commensurate with ability and opportunity for right man to become part of management team.

Excellent working conditions in very modern plant with brand new air conditioned offices located close to best Milwaukee suburban residential areas.

Give age and complete outline of education and experience. Replies kept confidential.

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BONDED®
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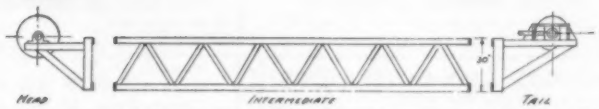


BONDED® Truss Frame Conveyors

Complete Pre-Fab sections of 8" Jr. I Beam or Truss Frame Conveyors, quickly and easily joined together on the job. Both types of conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2⅞" diam. shaft. Bonded Truss Frame Conveyors are built like a bridge. Designed for long free spans to 50 feet. Constructed of structural angle and reinforced with steel plate. Special high-tensile bolts are used to join all sections. Prices listed are for I Beam Frame Construction. Prices of Truss Frame Conveyors quoted on request. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 3/16" bottom cover and is fresh stock made by leading manufacturers.

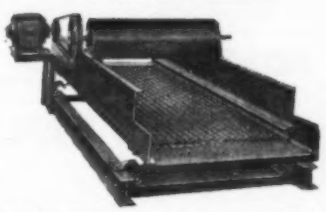
Conveyor Prices Include Belting

Belt Width	Length of Conveyor	List Price	Sale Price	Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722	14"	50'	$2222	$1144
14"	85'	3377	1733	14"	125'	4697	2407
16"	20'	1262	636	16"	45'	2137	1088
16"	60'	2662	1359	16"	90'	3712	1900
18"	25'	1477	794	18"	45'	2217	1166
18"	70'	3142	1648	18"	85'	3697	1933
18"	100'	4252	2220	18"	130'	5362	2797
20"	25'	1517	823	20"	60'	2882	1533
20"	75'	3467	1838	20"	90'	4052	2145
24"	25'	1590	898	24"	45'	2430	1330
24"	70'	3480	1875	24"	100'	4740	2514
24"	120'	5580	2950	24"	150'	6840	3603
30"	50'	2911	1617	30"	70'	3871	2119
30"	90'	4831	2614	30"	140'	7231	3852
36"	25'	1818	1118	36"	45'	2585	1678
36"	60'	3638	2096	36"	100'	5718	3214

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices acording to belt width. Prices include belting.

For 14" belt, add $16.84 per foot;
For 18" belt, add $19.24 per foot;
For 24" belt, add $21.78 per foot;
For 36" belt, add $27.95 per foot.
For 16" belt, add $18.04 per foot;
For 20" belt, add $20.37 per foot;
For 30" belt, add $24.76 per foot;
Write for Bulletins #1138 and #1189.

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



NEW BONDED® HEAVY DUTY VIBRATING SCREENS

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for Bull. #1086.
Priced from $443.00

HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. Write for Bull. #1087.
Priced from $1160.00

NEW BONDED® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 250 tons per hour. Write for Bull. #1140 & #1182.
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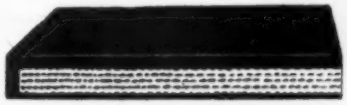

Width	Ply	List Price	Sale Price
14"	4	$3.52 foot	$2.83 foot
16"	4	3.96 foot	2.97 foot
18"	4	4.38 foot	3.29 foot
20"	4	4.83 foot	3.80 foot
24"	4	5.68 foot	4.26 foot
30"	4	6.97 foot	5.21 foot
36"	4	8.26 foot	6.18 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 3/16" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

Width	Ply	List Price	Sale Price
16"	4	$4.71 foot	$3.46 foot
18"	4	5.23 foot	3.83 foot
20"	4	5.73 foot	4.37 foot
24"	4	6.74 foot	4.94 foot
30"	4	8.28 foot	6.07 foot
24"	5	7.90 foot	5.78 foot

The following belts are 5-ply, 32 oz. duck:

Width	Top Cover	Bottom Cover	List Price	Sale Price
24"	⅛"	3/16"	$ 8.56 Ft.	$ 6.42 Ft.
30"	¼"	3/16"	10.52 Ft.	7.89 Ft.
36"	3/16"	3/16"	14.21 Ft.	10.66 Ft.

A heavier duty 28 oz. duck belt with ¼" top rubber cover x 3/16" bottom rubber cover having 3500# to 4000# average cover tensile, 20# to 24# average friction pull, or the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price	Sale Price
18"	4	$5.67 foot	$4.30 foot
20"	4	6.32 foot	4.61 foot
24"	4	7.32 foot	5.41 foot
24"	5	8.53 foot	6.31 foot

Other widths, plies, duck weights and cover thicknesses available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE

3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable prelubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers priced from $61.00. Write For Bulletin #1138.

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PHONE Days: Hickory 4-2186 — WRITE FOR FREE CATALOG AND PRICES — PHONE Evenings: AX. 1-2213, HU. 6-3156

110 Bellevue — Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders — COLUMBUS 7, OHIO

CONSTRUCTION EQUIPMENT SPECIALS

ECA REBUILT

Locomotives

4—8-ton Standard Gauge, 3 Brookville, 1 Plymouth, gasoline powered.
2—10-ton Plymouth Standard Gauge with Caterpillar Diesel engines.
1—65-ton Whitcomb Diesel Electric.

Guy Derrick

1—#2 Guy Derrick — American Terry, Steel Erectors Type, 110′ mast, 100′ boom. Cap. 10-ton @ 98′ radius, 20-ton @ 50′ radius.

Hoists

Gas—Diesel—Electric—Steam
1-, 2-, or 3-drum—3500# to 12,000# L.P.

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1—1¾ yd. Shovel Front for Lorain Model 80 or 820 series. 23′ boom, 18′ dipper. Amsco Bucket. Like New.

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1—100 KW Ideal AC, 127/220/230/400/440 volt, 3 ph, 50 or 60 cycle, with Hercules DNX diesel engine, skid mounted. Weight 16,170#.

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FOR SALE

1 Adnum Paver 1941. Converted to stone machine.
1 Apsco Spreader 1953. Used 4 months.
1 Barber Greene Stone Machine 1946.
1 BS Apsco 3 wheel Roller 1941. No motor.
1 Hauck Heater, Littleford 1950.
1 Huber Road Maintainer 1951.
1 1½ cu. yd. Pettibone Speedal Front End Loader 1954.
1 Koehring #19 ¾ yd. Backhoe 1950. Needs repair.
1 HD 10 Allis Chalmers Bulldozer. Needs repair.
1 HD 14 Allis Chalmers Bulldozer. Needs repair.
1 Quarrymaster I. R., GD-8 1951. Complete with all accessories.
1 Kennedy #37½ Crusher less electric motor, includes spare eccentric and lower mantle.
1 75 HP A.C. Motor for Compressor. 600 rpm, 3 ph, 60 cy, 440 V, 94 A, open.
1 25 HP G.E. Motor, Type MT332-B-25-900, 220 V, 3 ph, 60 cy, 64 A, open.
4 Westinghouse Transformers 750 KVA, 34,500 Primary Volts. 480V, secondary volts, 60 cy, 1 ph.
4 Breakers, Main Line. Roller Smith 750 KVA, 600 V, 800 amps, Type HD, secondary.
1 Switch for 750 KVA Transformers, primary less Buss Bar.
1 Humer Electric Vibrating Screen #50-2062 Feed End, #50-2061 Discharge End with Control box, 220 V, 60 cy, single phase.
2 Symons V Screens, New, with 5 HP, 1800 rpm ball-bearing motors. Size 36″ x 12′. One new, one slightly used.
1 Chisholm-Moore Hoist, 20 ton cap., including 6″ x 12″ x 20″ I Frame, less pull chain.
1 I.R. #54 Rock Drill Steel Sharpener. Complete with accessories and with spare parts.
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New Gruendler Crushers
New 10x24 Roller Bearing Jaw Crusher
New 14x24 Roller Bearing Jaw Crusher
New 30x18 Heavy Duty Gear-Type Double Roll Crushers

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All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

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2—5′ x 25′ Gates Tube Mills end feed and discharge, complete with magnetic drives and controls.
2—F. L. Smidt 4′ x 35′ rotary dryers.
1—10 cylinder Norblo air filter, 11,000 CFM.

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Located at Mendota, Minn.

2—Whitcomb, 5 ton Locomotives, 38 inch gauge, repowered in 1954 with Continental M-330 power units, 2.6 to 1 reduction, complete with generator, starter and 10 inch Twin Disc Clutch. Each...$1,000.00
6—Four Cubic Yard, Easton Quarry Cars, Phoenix Type, all steel, side dump cars, 36 inch gauge. Each 200.00
6—Four Cubic Yard, Lakewood Quarry Cars, 36 inch gauge, all steel, side dump cars. Each 200.00

As is and where is, subject to prior sale.

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Midway 6-8601

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1—8′ x 9′ x 100′ VULCAN KILN, riveted plate and complete with motor and drive.
2—5′ x 22′ TUBE MILLS with trunnion feed and discharge, 200 HP motor, 600 RPM, 3/60/440.
3—6′ x 22′ TUBE MILLS, 400 HP motor, drive and control.

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1950 International Truck Model L-192—Ten wheel 8 cube load with Rehberger roll off body. Excellent condition.

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WANTED TO BUY

1—8′ x 28′ Dryer for Asphalt Plant
1—4′ x 12′ Symon Screen

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FOR SALE

9—Rotary Dryers & Kilns: 3′x24′; 4′x6″x40′; 5′6″x40′; 6′x60′.
2—Rotary Coolers: 104″x30′; 104x70′
6—BALL MILLS: 1 Al. Ch. Steel Ball Mill, 6′x16′; Patterson 5′x22′, with 200 HP motor. UNUSED.
A1. Ch. 7′ x 24′ Compeb 500 HP
Hardinge 4½′ D x 16′; 10′ D x 96″
1—Worthington Air Compressor, 11 x 7 x 2 Type YB2—75 HP

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POplar 3-3505

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11 Dorr-Oliver 6″ Duplex Diaphragm Pumps #6VM 9 to 30 CFM, also 6 same type 8″ 12 to 75 CFM #8W. Good condition. Never used. Also have spare parts.

Write C. F. SPENCER
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Handle more cars better—cost less to install and maintain. Foster stocks all Rail Sections 12# thru 175#, Switch Material and Track Accessories.

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Special: Pioneer conveyor, 30″ width, with gravity belt tightener, 200′ long.

Hopto 120 on IH truck
2 yd. Dumpcrete
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Lessman ⅝ yd. loader
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Northwest 165 crane-dragline
Bucyrus Erie H-3 hydro crane
Austin Western shovel
Trackson shovel
Pioneer 5x12 screen
Pioneer 3x10 screen
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This equipment rebuilt in our modern plant by expert mechanics. Come see it!

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GRAVEL PLANT

Single Unit portable Universal Gravel Plant consisting of 1024 Jaw Crusher, 14″ twin roll crusher, 3 x 10 3½ deck screen, necessary conveyors, etc., all on running gear powered by GMC diesel engine. Excellent condition. F.O.B. Buffalo, New York. $25,000.

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WANTED

Good Used 18" & 24" Trough Idlers, any amount.
Late Model Vibrating Screens.
Jaw Crushers, all sizes.
Gearmotors 3 to 15 H.P.

FOR SALE

DIAMOND PORTABLE CRUSHING PLANT, 15x24, PNEUMATICS.
CEDAR RAPIDS 25 YD. SECONDARY PORTABLE CRUSHING PLANT.
Acme 9" x 16" Jaw Crusher.
Acme 14" x 26" Jaw Crusher.
Climax 10x20" Jaw Crusher.
New Universal 3x5 s.d. Screens (2)
New Universal 3x8 s.d. Screen.
New Universal 3½x8 s.d. Screen.
Seco Screen 4' x 8' double deck.
Seco Screen 4' x 14' triple deck.
Revolv. Screen 48" x 20', trunnions.
6" Enclosed Bucket Elevator.
8" Enclosed Bucket Elevator.
75' x 10" Enclosed Elevator.
6" Encl. Perfect Discharge Elevator.
Sandvik Steel Conveyor 30" x 45' with idlers and pulley.
12" x 30' Screw Conveyor.
Trough Idlers 42" & 48", antifriction.
Trough Idlers 36", 5 roll type (69).
New Idlers, 18" and 24".
Plain Bearing Trough Idlers, 5 roll type, 18" and 24".
Misc. Size Large Conveyor Pulleys.
Eriez Perm. Magnetic Pulley 20" x 20".
Jeffrey 35 Cu. Yd. Bin.
15 Ton Stiffleg Derrick, 110' Boom.
Wright 8 Ton Chain Hoist.
Sullivan Elec. Tugger Hoist, 7½ H.P.
Small Gasoline Water Pumps.

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136 Colt St. Irvington 11, N. J.

FOR SALE BY OWNER:

1—Motor, electric 4/20/27 H.P. Allis-Chalmers, three speed, 1740/870/1150 R.P.M. open type, 3 phase, 60 cycle, 440 volt.
1—Motor, electric, 10 H.P. G.E. 1160 R.P.M., 220 Volt, 3 phase, 60 cycle, double extended shaft.
1—Motor, electric, 40 H.P. Allis Chalmers, 865 R.P.M., 3 phase, 60 cycle, 440 volt, slip ring open type.
2—Locomotives, 8 and 12 ton, 36" gauge Plymouth.
1—Bucket, 1¼ yard capacity for Lull Shovel Loader.
1—Screen 3'x10' single deck, Allis-Chalmers low head.

for further information contact
J. H. CLEMENTS

BASIC INCORPORATED
MAPLE GROVE, OHIO
POST OFFICE, FOSTORIA, OHIO

FOR SALE

Sauerman R.B. 3 drum Drag Scraper Hoist, without power—$2500.00. Also offer some new spare parts.

Purchasing Department
THE HUDSON COAL CO.
Scranton 1, Pa.

FOR SALE

1 Model 8-12" high Columbia Block Machine.
1600 18x18¼" steel pallets
58 racks
18 ft. Stearns skip
Molds for 2-4-6-8-10-12 inch blocks
(This equipment was replaced with a Model 12 Columbia in May 1957)
2 Carpenter 750 gal. capacity septic tank forms and allied equipment
1 GMC Delivery truck for septic tank

CARTER'S CONCRETE BLOCK PLANT
R.R. #6 MONTICELLO, INDIANA

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40 TON DIESEL LOCOMOTIVE CRANE
Orton Serial #43016—built 1942, with 75 ft. boom. Air operated travelling brakes and clutch controls. Powered by Caterpillar D-17000 engines. Can be returned to U.S. free of duty.

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Storage bins from 100 to 1,000 tons capacity, single or multiple compartments. Quote full description, location, and price.

WESCO MATERIALS CORPORATION
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FOR SALE

RECONDITIONED, REASONABLE

1 Stearns M50 Block Machine, with mold boxes for 8x8x16, 8x12x16, 4x8x16 and 16x16x8 Chimney blocks
1 Stearns Front Feed Automatic Pallet Return
1 Stearns Pneumatic Offbearer
1 Kelley 60 cu. ft. Skip Hoist
1 Kelley 60 cu. ft. Mixer

60 Steel Curing Racks (72 block capacity)
2191 Steel Pallets 5/16" x 18½" x 18½"
Spare Parts

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Farmingdale, N. J.

EQUIPMENT WANTED
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GRINDING MILLS
BALL MILLS—3'x4', 4'x8', 5'x6', 5'x8', 5'x10', 6'x5', 6'x7', 6'x8', 6'x10'.
HARDINGE MILLS—4'6"x16", 6'x14", 6'x22", 6'x36", 7'x22", 8'x36", 8'x48", 10'x48".
ROD MILLS—3'x10', 4'x8', 4'x9', 4'x14', 5'x8', 5'x10', 5'x14', 6'6"x14'6".
TUBE MILLS—5'x14', 5'x22', 5'6"x22', 6'6"x21'.
COMPEB MILL 7'x24'.

HAMMERMILLS
JEFFREY—15"x8", 24"x18", 42"x36".
PENNSYLVANIA—SXT-13-48 "THOR", SXC-13-48 REVERSIBLE, CF-5-32 REVERSIBLE IMPACTOR.
CEDAR-RAPIDS—5360H DOUBLE IMPELLER IMPACT BREAKER, 3030 DOUBLE IMPELLER IMPACT BREAKER.
WILLIAMS—GA-60 - 44"x60" FEED OPENING.

APRON FEEDERS
54"x10'3"—54"x16'—3'x12'.

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OLIVER DRUM—8x10', 12'14', 14'x18', 11'6"x18'.
DORR RAKE CLASSIFIERS—5'x25', 8'x38', 12'x31', 14'x30'.
DORR BOWL RAKE—3'x24'x12', 5'x30'x26', 16'x24'x28'.
WOODS SAND CLASSIFIER—72", 96".
CONVEYCO SAND CLASSIFIER—4'x10'.
17 THICKENERS—100', 80', 36', 24', 16' & 12'.
20"x15 EAGLE SINGLE SCREW COARSE MATERIAL WASHER.

ROTARY DRYERS & KILNS
DRYERS—40"x21', 4'x20', 6'x40', 6'x60', 8'x125'.
KILNS—6'x28', 6'x7'x80', 7'x110', 8'x125'.

JAW CRUSHERS
BLAKE TYPE—66"x84", 56"x72", 36"x48", 36"x42", 30"x36", 24"x36", 18"x36", 16"x32".
SINGLE SHAFT—20"x36", 18"x36", 10"x24".
CAM & ROLLER—24"x40", 16"x32", 14"x26", 11"x26", 10"x20", 6"x20".

GYRATORY FINE REDUCTION CRUSHERS
SYMONS—3', 4', and 20".
KENNEDY—19S, 25S, 37S.
SUP. McC.—6", 10", 18".
TRAYLOR—3' TYPE TZ.

GYRATORY PRIMARY CRUSHERS
6", 10", 14", 16", 26" & 36" SUP. McC.—Gates AL. CHAL. 3, 4, 5, 6, 7½, 8, 9, 12K.

15x24 PORTABLE CRUSHER
Model 15 A Diamond Crushing Plant, 15x24 Jaw Crusher, 30'x8' Apron Feeder, Hopper 24" x 26' Conveyor, Gasoline Engine on Pneumatic Tires.

2A CEDAR RAPIDS CRUSHER
24x16 Rolls—3'x8' Screen on Wheels with 4 belt conveyors & Gas Engine.

STEEL SHEET PILING
1500 TON MZ 32, DP2, AP3, 30' & 60'.

STEEL DERRICKS
GUY: 3 TON 85 FT. BOOM, 25 TON 60 FT. BOOM, 15 TON 100 FT. BOOM, 20 TON 115 FT. BOOM, 50 TON 100 FT. BOOM.
STIFF LEG: 5 TON 70 FT. BOOM, 15 TON, 100 FT. BOOM, 25 TON 100 FT. BOOM, 75 TON 135 FT. BOOM. 1—5 TON 100 FT. BOOM.

RAILWAY CARS
177—DUMP STD. GA.—20, 16, 12, 6 & 4 YD.
36—FLATS—10 TON, 40 TON, 50 TON CAP.
44—TANK CARS—8,000 & 10,000 GAL. CAP.
75—V Dump Cars, 1½ & 2 Yd.

DIESEL LOCOMOTIVES
1—25 TON, 1—80 TON GEN. ELECTRIC.
44 TON G.E., 6 TON WHITCOMB & 10 TON PLYMOUTH. 1—65 TON WHITCOMB.

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1—Model LP601 Cummins Power Unit—Completely overhauled—New heads $5250.00
1—Model D17000 Caterpillar Power Unit—Good Condition $2750.00

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3—1000 KVA Penn 33000-2500/4330Y
3— 667 KVA Mol. 2400-480
3— 500 KVA W-H 33000-2400/4160Y
3— 333 KVA Penn 2400-240/480
3— 333 KVA W-H 12000-2400
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GOOD USED COAL STRIPPING EQUIPMENT

625 Page Diesel Drag, 150', 10 yd.
4500 Manitowoc Drag, 140', 4½ yd.
621-S Page Diesel Drag, 135', 6 yd.
7-W Monighan Elec. Drag, 120', 7 yd.
618 Page Diesel Drag, 120', 5 yd.
5-W Bucyrus Monighan Drag, 120', 5 yd.
2400 Lima Dragline, 130', 5 yd.
111-M Marion Diesel Drag. 80', 5 yd.
1055 P&H Dragline, 80', 3½ yd.
1201 Lima Dragline, 85', 3 yd.
1201 Lima Comb. Shovel & Crane
955 P&H Dragline, 90', 2½ yd.
54-B Bucyrus Erie Drag, 85', 2½ yd.
3500 Manitowoc Drag, 85', 2½ yd.
3500 & 3000 Manitowoc Cranes
604 & 802 Lima Cranes
5480 Marion Electric 15 yd. Shovel
151-M Marion Elec. 5 yd. Shovel
4500 Manitowoc 5 yd. H. L. Shovel
1601 Lima 4 yd. Standard Shovel
120-B Bucyrus Erie 4 yd. Electric Shovel
1201 Lima Standard 3½ yd. Shovel
1055 P&H 3½ yd. Standard Shovel
111-M Marion 3 yd. H. L. Shovel
1201 Lima 2½ yd. H. L. Shovel
955 P&H 2½ yd. Standard Shovel
802 Lima Comb. H. L. Shovel & Drag
3500 Manitowoc 2 yd. H. L. Shovel
51-B Bucyrus Erie 2 yd. Shovel
Unit 1020 ¾ yd. Shovel
P & H, Lorain, Bucyrus Erie Truck Cranes
600 Reich Heavy Truck Mounted Rotary Air Drills
58-BH Joy Champion Rotary Air Drills
McCarthy Coal Auger Drill
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Mayhew Rotary Truck Mounted Air Drills
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42-T, 29-T — 27-T Well Drills

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton Nat'l. Bank Bldg.
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FOR SALE

USED QUARRY AND CRUSHING EQUIPMENT IN USE NOW AND CAN BE SEEN IN OPERATION. AVAILABLE ABOUT NOV. 1, 1957.

QUARRY EQUIPMENT

Sanderson Cyclone Drills
Quarry Cars, 10 Ton
#92 Marion Steam Shovels
Tracks

CRUSHER EQUIPMENT

50" Gyratory Crusher
Pan Feeder
#13 Pennsylvania Hammer Mill
Car Hoists and Car Dump Hoists
Crusher Building
36" Belt Conveyor complete
24" Belt Conveyor less Belt
Rotary Screens
Screen Buildings
Other Misc. Items.

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High grade gravel bank near Poughquag, New York, offered for quarrying on royalty basis.

Telephone New York City
Bryant 9-2236

CLASSIFIER—Dorr 26' bowl. 10 tons per hour.
COLLECTOR—Ducon Wet Type. 10,000 CFM capacity.
PAN CONVEYORS—24" x 18'—30" x 33'—36" x 54'.
ELEVATOR—Open Inclined 90° centers with 15 x 14" buckets.
GRIZZLY ROLLS—Frame contains 6 12" dia. x 36" ribbed live rollers.
HAMMERMILL—Penna. S-6.
SAND DRAG—Telsmith 36" x 25' with metal tank.
SEPARATOR—Dings Magnetic Crossbelt—220 volt.
MOTORS—25 AC Induction 3 to 75 HP—440/3/60.

G. & W. H. CORSON, INC.
Plymouth Meeting, Pa.

QUARRY SHOVELS

Bucyrus Erie 22B shovel Serial 59097 with 371 GM Diesel Power. Lorain L50 one yard shovel with Cat D318 Diesel Power.

Both rigs overhauled and in good condition.

JAMES W. BELL CO., INC.
Box 550
Cedar Rapids, Ia.

CRANES & SHOVELS

Bantam	"M-49"	⅝ yd. Hoe, mounted Chevrolet Tandem Truck.
Insley	"K-12"	½ yd. Trench Hoe, Crane or Dragline (2).
Marion	"331"	⅝ yd. Shovel or Dragline.
Byers	"83"	Used ⅝ yd. Crane or Dragline.
Link-Belt		Shovel Attachment complete for LS-85 (⅝ yd.).

LOADERS

Caterpillar	"D-6"	Diesel Tractor w/HI-Lift Cable Traxcavator, 1950 model in fine shape.
Allis-Chalmers	"HD-5G"	Used Diesel Tractor w/Tractomotive Front End Loader, Rebuilt tracks and engine.
Pettibone	"10"	Used 1 yd. Tractor Shovel, 4-wheel drive.
Barber-Greene	"545-46-3"	Used Rubber-Tired Bucket Loader.

MISCELLANEOUS

Gruendler	"1024"	Roller Bearing Jaw Crusher.
Parsons	"21"	Ladder-Type Crawler-Mounted Trenching Machine, digs 9' deep.
Pettibone-Wood	"820-A"	New Windrow Proportioner. Reduced for quick sale.
Pettibone-Wood	"P620"	Used Preparizer, G-M Power, Diesel. Will rent or sell.
Bayport	23 Yd.	New Aggregate Bins.
Rex	3 Yd.	HI-Discharge Moto-Mixer (4¼ yd. Agitator) mounted I-H "L170" Tandem Axle Truck.
Jaeger	3 Yd.	(4¼ yd. Agitator) HI-Discharge mixer, 1945 model, mounted on 6-wheeler. Cheap.

NOTE: This Equipment Located in our Yard

EIGHMY EQUIPMENT COMPANY
120 S. Pierpont
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RELAYING RAIL
20# — 30# — 40#
NEW RAIL IN STOCK
LEFTON INDUSTRIAL CORP.
GENERAL OFFICE: 212 VICTOR STREET
ST. LOUIS 4, MISSOURI

FOR SALE

As we have installed larger STEARNS equipment, we have the following good used equipment for immediate sale:

1—Columbia Model 8A automatic two-unit block machine.
Mold boxes for: 12" x 8" x 16", 8" x 8" x 16", 8" x 8" x 16" header, 8" x 5" x 12", 8" x 4" x 16" and 6" x 8" x 16".
Parts for corners, halves, sash, bull nose, knock out lintels and solids. Also, molds for 1⅝" patio, Norman, Gothic, and common brick.
1—Stearns 28 cu. ft. skip hoist.
1—Stearns 28 cu. ft. mixer with moisture master meter.
1—42 cu. ft. Go-Corp mixer.
1—42 cu. ft. Stearns skip hoist.
2—4000# Truck-Man platform trucks.
2—4000# hand lift trucks.
25—60 block (pipe) racks.
51—48 block sectional block racks.
50—72 block racks.
450—Plywood pallets.
1—Columbia splitter.
2—Aggregate bins, 12½ yds. capacity, each with batcher.

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Back hoe attachment for ⅜ cubic yard Michigan crane, complete with all chains and sprockets.....$350.00

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Used 3 Drum Hoist powered by 100 hp or larger electric motor for 16000 lb or larger rated line pull.

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3', 4' & 7' Symons cones. 8466 JAW CRUSHER. 4022 Pioneer triple roll. & 5424 dbl. roll. 5360 C. R. Impactor. 4100 ft. 42" conveyor.

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This equipment is offered subject to prior sale.

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A LARGE AUCTION

Portable Crushing & Construction Equipment

Albuquerque, New Mexico

SATURDAY, AUGUST 17, 9 A. M.

LOCATION: Sale will be held at 515 Rankin Ave., N.E., Albuquerque.
NOTICE: This is a complete dispersion sale of all of G. I. Martin's, Contractor, equipment. Mr. Martin is retiring from the construction business.

Cedar Rapids Master tandem 1036 crushing plant, complete, Cat D17000 diesel power, 12—10:00x20 tires, plant is excellent; Cedar Rapids Pacific Coast Master tandem crushing plant, complete, Cat D17000 power, on special pneumatic truck, plant just off job; C-R AAAA portable primary crushing plant, complete, Cat D13000 power, walking beam and tandem rear axle, very good; C-R AAA 2236 portable primary crushing plant, complete, Cat D8800 power, tandem rear axle, very good; conveyors; bins; material washer; batcher; Murphy 30 ton portable truck scales, complete; Cat D-7 tractor w/Cat PTO w/G-D 360 cfm compressor and G-D 99D drill w/10′ mast, all mounted; wagon drills. B-E 38-B shovel w/Cat D13000 power; B-E 22-B shovel w/Cat D-318 power; 22-B 45′ drag boom; Lorain TL-20 shovel; TL-20 35′ drag boom; ¾ yd. TL-20 backhoe attach; B-E 10-B shovel w/Buda gas power; B-E 28′ drag boom; Michigan ⅜ yd truck shovel; drag and clam buckets. Cat D-9 tractor w/dozer; D-8 15A w/dozer; 2 D-8's 14A 1 w/Cat #8 hyd ripper & dozer and 1 w/dozer; D-8 13A w/#25; 6 D-8's from 2U 23116 to 1H 8734, 4 w/dozers; D-8 w/Ateco ripper; 2 D-7's, 17A & 3T, both w/dozers; AC rubber tired front end loader; wheel tractors. 3 Euclid 23TDT motor scraper units, new in '56; 2 Euclid 49FD rear dump trucks w/quarry bodies; Cat #80 scraper; 2 LeT 'FP' scrapers; 3 Cat #12 graders; Etnyre distributor; C-B asphalt heaters; road sweeper; broom; roadmixer; windrow proportioner; spreaders; cement mixers; Galion & B-S tandem rollers; Tampo 50 ton compactor; pneumatic rollers; sheepfoot rollers; welders lite plants; pumps; irrigation pump; turbine pumps; shop equipment; B-G bkt loader; 2 G-D 210D air compressors; jackhammers; paving breakers; tampers; office equipment; and many other items.

2 Mack diesel truck tractors, '55 & '54; 2 Mack gas truck tractors, '57 & '50; 2 Miller & Smith lowboys, '55 & '52; other lowboys, floats, van parts trailers, and semi-water-trailers; 2 '52 Chev mixer trucks w/Rex 2 yd hi-discharge moto-mixers; 2 Ford trucks w/complete service units; Ford, IHC & Chev trucks; Pickups & Jeep.

NOTICE: Much of this equipment, including the crushing equipment and tractors, has been completely reconditioned and it is practically all in very good condition!!! Don't fail to attend this sale!

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8" Telsmith Gyratory Crusher
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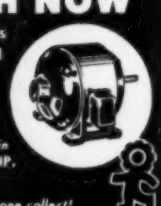

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The 101-SE is a highly portable plant. The frame is extra strong to hold rigid alignment of all equipment and drives. A rocker beam with full width axles supports most plant weight. Four wheels, each with dual tires, oscillate separately to compensate for rough terrain.

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Here's a high output, mobile gravel plant that combines top efficiency with modern ease of operations and low maintenance. It is DIESEL-ELECTRIFIED, PUSH-BUTTON OPERATED—a triumph in crusher engineering.

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Regardless of load, all components operate at peak efficiency at all times, delivering top production and accurately sized aggregates. A single convenient push-button station controls the plant.

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Inclined positive-throw type vibrating screen.

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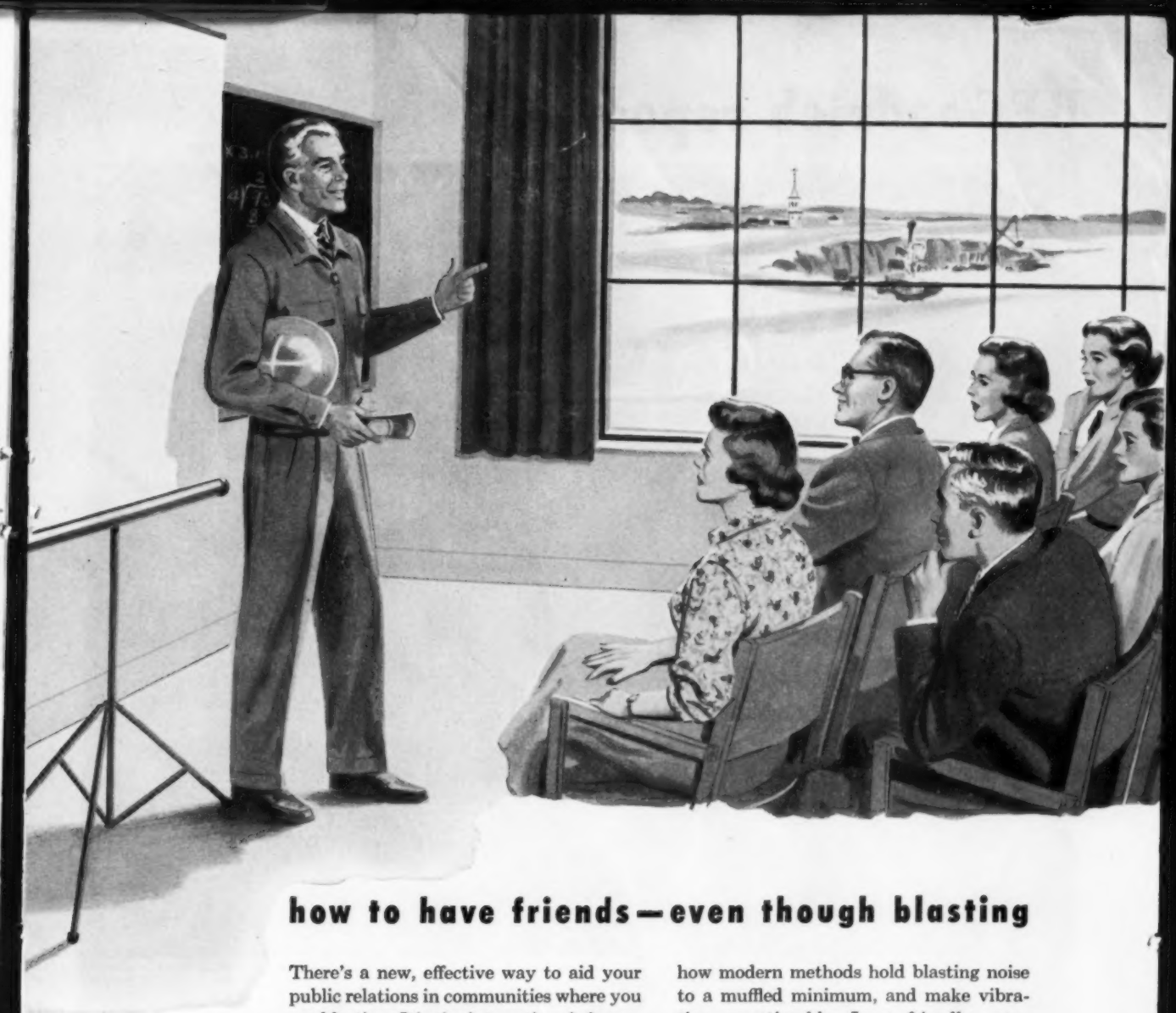

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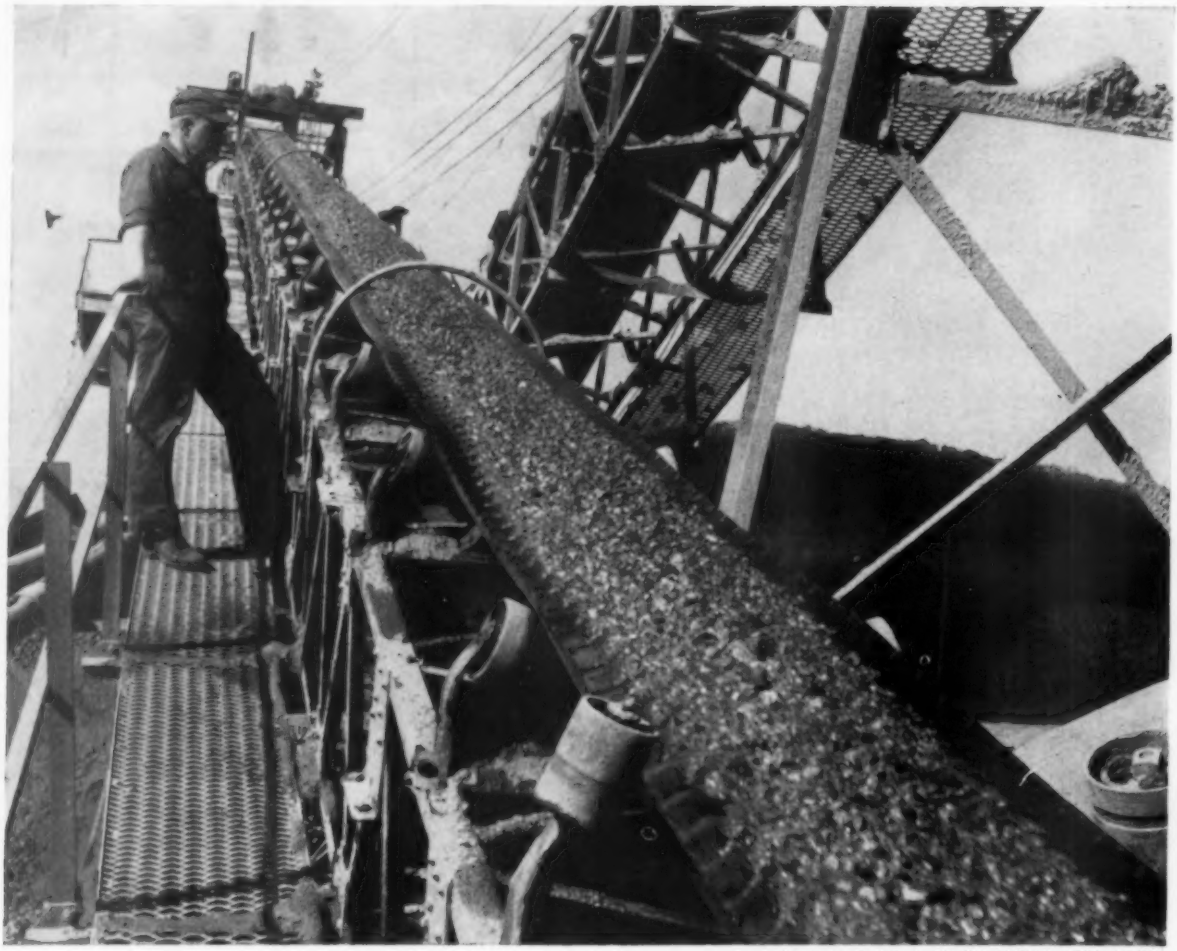
B.F.Goodrich report:



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Rocks used to slide down faster than they went up

B. F. Goodrich improvements in rubber brought extra savings

Problem: Getting tons of sopping wet rock and gravel up that steep incline was causing plenty of trouble at this plant. When a regular conveyor belt was used, the wet gravel often washed *down* faster than the moving belt could carry it *up*.

What was done: Then a B.F.Goodrich man told the company about a special kind of belt, developed by B.F. Goodrich, to handle wet materials. This "Riffle Grip" belt, as it is called, is made with a series of extra-tough rubber ridges molded into the cover. The tread that these ridges form holds the gravel in place, and at the same time, channels the water to the edges of the belt where it falls off.

Savings: This B.F.Goodrich belt was tried, and it works perfectly. The gravel flows smoothly uphill. More tons are handled with no slipping, no sliding, no problems of any kind.

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Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich conveyor belt described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-114, Akron 18, O.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Farval works in Africa, too—lubrication time reduced 93%, grease use cut 83%

FARVAL—
Studies in Centralized Lubrication
No. 202

● Here at a copper mine in Northern Rhodesia, Farval systems were installed on power shovels used to remove overburden. Not only have bearings been protected fully by adequate lubrication, but the time and lubricant savings reported are beyond expectation.

Time required for lubricating shovels has been reduced from two hours per shift to only eight minutes — a 93% reduction. Grease consumption has been cut from 400 pounds per month to only 70 pounds—a saving of 83%.

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Find out how Farval can help you. Write for Bulletin 26-S, newly revised presentation of the features and advantages of Farval Centralized Lubrication, complete with engineering data on all types of systems. The Farval Corporation, 3280 E. 80th St., Cleveland 4, O.

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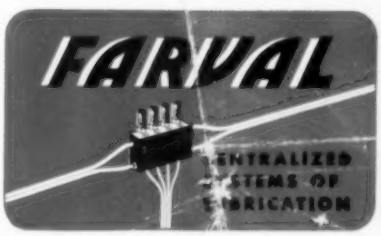
KEYS TO ADEQUATE LUBRICATION—
Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.

Inset above shows Farval lines and valves mounted on shovel undercarriage.



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